DEPARTMENT OF THE ARMY
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Change 6

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Manual
No. 385-1-1

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Safety and Occupational Health
SAFETY AND HEALTH REQUIREMENTS MANUAL
2008 EDITION

1. These changes shall be in effect as of 5 July 2011. For contractual work, all contracts whose date of solicitation is 15 July 2011 or later shall consider this change in effect. All underlined wording is specific to this change.

2. These changes/updates are required to: update USACE requirements to parallel recently published OSHA requirements; streamline, improve and clarify requirements for crane, derrick and hoisting operations.

3. This Change affects the following:

a.	Table 11-1:	Change values;
b.	New Table 11-2:	Add;
c.	Existing Table 11-2:	Re-title as Table 11-3;
d.	Existing Table 11-3;	Re-title as Table 11-4;
e.	Section 11, various paragraphs:	Change Table references;
f.	Remove Section 16:	Replace with new Section 16;
g.	Paragraph 18.G.29:	Change wording;
h.	Paragraph 18.G.29:	Add new note afterwards;
i.	Appendix I:	Delete;
j.	Appendix Q:	Add 3 new definitions;
k.	Appendix S:	Add 2 new references.

4. Make corrections/changes to the following paragraphs. All underlined wording is specific to this change.

a. Table 11-1, Change values:

TABLE 11-1

MINIMUM CLEARANCE FROM ENERGIZED OVERHEAD ELECTRIC LINES

Voltage (nominal, kV, alternating current)	Minimum clearance distance
Up to 50	10 ft (3 m)
51 – 200	15 ft (4.6 m)
201 – 350	20 ft (6 m)

351 – 500	25 ft (7.6 m)
501 – 750	35 ft (10.7 m)
751 – 1000	45 ft (13.7 m)
Over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

b. Table 11-2, Add new table as 11-2:

Table 11-2

MINIMUM CLEARANCE DISTANCES WHILE TRAVELING WITH NO LOAD

Voltage (nominal, kV, alternating current)	While traveling - minimum clearance distance
Up to 0.75	4 ft (3 m)
.76 to 50	6 ft (4.6 m)
51-345	10 ft (6 m)
326 – 750	16 ft (7.6 m)
751 - 1000	20 ft (9.1 m)
Over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

c. Existing Table 11-2, Re-title as Table 11-3;

d. Existing Table 11-3, Re-title as Table 11-4;

e. Section 11, various paragraphs, Change Table references;
- Paragraph 11.F.04.b, change "Table 11-1" to "Table 11-2";
- Paragraph 11.H.01, change "Table 11-2" to "Table 11-3";
- Paragraphs 11.I.03.a, 11.I.03.b, 11.I.07.c(2), 11.I.09.b, 11.I.10, 11.I.11.b, 11.I.23, 11.I.62, 11.I.62.c, 11.I.62.e, change "Table 11-3" to "Table 11-4";

f. Paragraph 18.G.29, change wording: "18.G.29 Powered Industrial Trucks (PITs)/Forklifts and Telehandlers. All PITs and telehandlers shall.... "

g. Add NOTE under 18.G.29:

➢ ***NOTE: When PITs or Telehandlers are configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load, refer to Sections 16.A.01. > Exemptions and 16.V.***

h. Appendix I, DELETE.

i. Appendix Q: Add 3 new definitions:

Assembly/Disassembly director (A/D director): means a person that will driect the assembly/disassembly; who meets the criteria for both a competent person and a qualified person; an individual who meets the requirements for an A/D director, irrespective of the person's formal job title or whether the person l non-management or management personnel. The A/D director must understand the applicable assembly/disassembly procedures; must review the a/d procedures prior to the commencement of a/d.

Qualified Evaluator of Signal Persons (not a third party): means a person employed by the signal person's employer who has demonstrated that he/she is competent in accurately assessing whether individuals meet the Qualification Requirements in Section 16.B.06 for a signal person.

Qualified Evaluator of Signal Persons (third party): means an entity that, due to its independence and expertise, has demonstrated that it is competent in accurately assessing whether individuals meet the Qualification Requirements in Section 16.B.06 for a signal person.

j. Appendix S, Add:

"ANSI/ASME B30.20".
"29 CFR Part 1926, Subpart CC- Cranes and Derricks in Construction".

5. File this change sheet in front of the publication for reference purposes.

FOR THE COMMANDER:

DIONYSIOS ANNINOS
Colonel, Corps of Engineers
Chief of Staff

SECTION 16

CRANES AND HOISTING EQUIPMENT

16.A GENERAL

16.A.01 The requirements of this Section are applicable to all cranes, derricks, hoists and power-operated equipment that can be used to hoist, lower and/or horizontally move a suspended load.

- **EXEMPTIONS:**

a. Anchor handling or dredge-related operations with a vessel or barge using an affixed A-frame;

b. Base-mounted drum hoists used to hoist personnel, guided and non-guided, whether powered by internal combustion engine, electric motor or other prime mover, to include air tuggers). ***See Section 16.U for equipment-specific requirements;***

c. Digger derricks used for utility/pole installation;

d. Vehicle-mounted aerial devices (i.e., Bucket Trucks), ***See Section 22.M,*** *and self-propelled elevating work platforms, See Section L****;***

e. Hydraulic Excavators, Wheeled/Track/Backhoe loaders used to transport or hoist loads/personnel with rigging are exempt from the requirements in 16.B.02 through 16.B.06 only. ***See Section 16.S for equipment-specific requirements;***

f. Powered Industrial Trucks (PIT's, i.e., Forklifts)/Telehandlers: when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load are exempt from the requirements in 16.B.02 through 16.B.06 only. ***See Section 16.V for equipment-specific requirements****;*

g. Machinery that hoists by using a come-a-long or chainfall;

h. Equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2,000 pounds or less: Operators are exempt from the operator qualification or certification requirements in 16.B.02 through 16.B.06 only. In addition, this equipment may not be used to hoist personnel;

i. Hoist Operators are exempt from 16.B.05, Physical Examination requirements UNLESS this equipment is used to hoist/lift personnel. This activity is considered a Critical Lift and as such, requires a physical examination for the operator. ***See also 16.C.01.c and Section 16.U*;**

j. Dedicated drilling rigs;

k. Tree trimming and removal work;

l. Gin poles when used for the erection of communication towers;

m. Helicopter cranes;

n. Roustabouts;

o. Stacker cranes.

16.A.02 Before any crane or hoisting equipment is INITIALLY installed OR placed on any USACE facility or project site for the first time, it shall be inspected, tested and certified in writing by a competent person to be in accordance with the manufacturer's recommendations and the requirements of this manual. ***> See 16.D, E and F.*** With respects to the intended use of the crane or hoisting equipment, take into account the age of the equipment, history of operation, testing and inspection, and anticipated future use.

16.A.03 The employer shall comply with all manufacturer's instructions, procedures and recommendations applicable to the operational functions of equipment, including its use with attachments. The safe operating speeds or loads shall not be exceeded. When they are not available, the employer shall develop and ensure compliance with all procedures necessary for the safe operation of the equipment and attachments according to:

a. Procedures for the operational controls must be developed by a qualified person.

b. Procedures related to the capacity of the equipment must be developed and signed by a Registered Professional Engineer (RPE) familiar with the equipment.

16.A.04 When the manufacturer's instructions or recommendations are more stringent than the requirements of this manual, the manufacturer's instructions or recommendations shall apply.

16.A.05 The use of electronic equipment for entertainment purposes while operating equipment is prohibited.

16.A.06 Mechanized equipment shall be shut down before and during fueling operations. Closed systems, with an automatic shut-off that will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

16.A.07 Inspections or determinations of road and shoulder conditions and structures shall be made in advance to assure that clearances and load capacities are safe for the passage or placing of any mechanized equipment.

16.A.08 Equipment requirements, as applicable to the type equipment.

a. An operable fuel gage;

b. An operable audible warning device (horn);

c. Adequate rearview mirror or mirrors;

d. Non-slip surfaces on steps;

e. A power-operated starting device;

f. Seats or equal protection must be provided for the operator and all personnel that are required to be in/on equipment;

g. Whenever visibility conditions warrant additional light, all vehicles, or combinations of vehicles, in use shall be equipped with at least two headlights and two taillights in operable condition;

h. Glass in windshields, windows, and doors shall be safety glass. Cracked or broken glass shall be replaced;

i. One (minimum) dry chemical or CO^2 fire extinguisher with a minimum rating of 10B:C installed in the cab or at the machinery housing;

j. All self-propelled equipment, whether moving alone or in combination, shall be equipped with a backup alarm. ***> See 18.B.01;***

k. Wind speed indicating device mounted on the crane, in a location where the maximum wind speed can be measured for the lifting activity;

l. Warning lights, attached to the applicable equipment shall be used as collision avoidance measures for airfield operations. Lighting shall be in accordance with guidance provided by the Federal Aviation Administration (FAA). ***For Airfield Operations, see Section 32.***

16.A.09 Rollover protective structures (ROPS) as required by the manufacturer must be in place and maintained.

16.A.10 The manufacturer's specifications and operating manuals for hydraulic equipment and attachments utilizing quick connect/disconnect systems shall be followed. After completing a switch in attachments, the equipment operator shall take the actions necessary to ensure the quick connect/disconnect system is positively engaged.

16.A.11 All guarding and safety devices shall be provided, used and maintained:

a. All belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts of equipment shall be guarded when exposed to contact by persons or when they otherwise create a hazard.

b. All hot surfaces of equipment, including exhaust pipes or other lines, shall be guarded or insulated to prevent injury and fire.

c. Platforms, foot walks, steps, handholds, guardrails, and toe boards shall be designed, constructed, and installed on machinery and equipment to provide safe footing and access ways.

d. Equipment shall be provided with suitable working surfaces of platforms, guardrails, and hand grabs when attendants or other employees are required to ride for operating purposes outside the operator's cab or compartment. Platforms and steps shall be of nonskid materials.

16.A.12 Work Area Control. When there are accessible areas in which the equipment's rotating superstructure (permanently or temporarily mounted) poses a risk of striking and injuring an employee or pinching/crushing an employee against another part of the equipment or another object, employees shall be prevented from entering these areas (i.e., communication or risk, placement/maintenance of control or warning lines, railings or barriers).

16.A.13 The controls of excavators or similar equipment with folding booms or lift arms shall not be operated from a ground position unless so designed.

16.A.14 Personnel shall not work in, pass under, or ride in the buckets or booms of excavators in operation.

16.A.15 Maintenance/repairs of cranes and hoisting equipment.

a. Maintenance, including preventive maintenance and repairs shall be performed in accordance with the manufacturer's recommendations. Records of maintenance and repairs conducted during the life of a contract shall be made available upon request of the GDA.

b. Replacement parts or repairs shall have at least the original design factor; replacement parts for load bearing and other critical parts shall be obtained from the original manufacturer, (if possible) or certified by a registered engineer knowledgeable in cranes.

c. All equipment shall be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. Equipment designed to be serviced while running are exempt from this requirement. ***> See Section 12.***

d. All repairs shall be made at a location that will protect repair personnel from traffic.

e. Cranes, hoisting equipment, or parts thereof that are suspended or held apart by slings, hoists, or jacks also shall be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

16.A.16 Parking.

a. Whenever equipment is parked, the parking brake shall be set.

b. Equipment parked on an incline shall have the wheels chocked or track mechanisms blocked and the parking brake set.

c. All equipment left unattended at night, adjacent to a highway in normal use or adjacent to construction areas where work is in progress, shall have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment.

16.B PERSONNEL QUALIFICATIONS

16.B.01 Cranes and hoisting equipment shall be operated only by designated qualified personnel. Proof of qualification shall be provided by the employer and shall be in writing. In addition to fully qualified crane and hoisting equipment operators, the following personnel may be designated to operate cranes and hoisting equipment under limited conditions (may not perform critical lifts):

a. Trainees under the direct supervision of the designated operator of the crane or hoist;

b. Maintenance personnel who have completed all operator qualification requirements. Operation is limited only to those functions necessary to perform maintenance or verify performance of a crane or hoist;

c. Inspectors who have completed all operator qualification requirements. Operation is limited only to functions necessary to accomplish inspection.

16.B.02 Crane Operator Requirements – General.

a. Crane Operators shall be able to communicate effectively with the lift supervisor, rigger(s), flagmen and other affected employees on site.

b. Prior to the start of a specific activity or task, documentation of operator qualifications shall be included in the AHA and provided to the

GDA (contractor operators) or the supervisor/leader of the activity/task (government operators).

c. Qualification for all crane operators shall be by successful completion of written and operational testing and designation of all crane/hoist operators shall be by the employer after review of the qualification documents.

d. All crane operators shall have knowledge of USACE crane safety requirements and manufacturer requirements and recommendations provided in the crane operator manual.

e. Crane operators shall demonstrate their ability to read, write and comprehend in the language of the crane manufacturer's operation and maintenance instruction materials, exhibit acceptable arithmetic skills and load/capacity chart usage and use written manufacturer procedures applicable to the class, type and capacity of equipment for which certification is being sought.

16.B.03 Crane Operator Qualifications and/or Certifications. The employer must ensure that, prior to operating any equipment covered under Section 16, the person operating the equipment is covered by paragraph 16.B.01, or is qualified or certified to operate the equipment in accordance with one of the following options:

a. Option 1. A current certification by an accredited crane operator testing organization. For a testing organization to be considered accredited to certify operators, it must:

(1) Be accredited by a nationally recognized accrediting agency based on that agency's determination that industry recognized criteria for written and practical testing materials, conditions and administration are being met;

(2) Administer written and practical tests that assess operator applicants regarding necessary knowledge and skills and that provided different levels of certification based on equipment capacity and type;

(3) Have procedures for operators to re-apply and be retested in event operator applicant fails a test or is decertified;

(4) Have testing procedures for recertification;

(5) Have accreditation reviewed by the nationally recognized accrediting agency at least every 3 years;

(6) An operator is deemed qualified to operate a particular piece of equipment for that class, type, and capacity of equipment or for higher - capacity equipment of that type and class. The operator's certificate must state the type, class and capacity of equipment on which the operator was certified;

- ***NOTE: If no accredited testing agency offers certification examinations for a particular type and/or capacity of equipment, an operator will be deemed qualified to operate that equipment if the operator has been certified for the type/capacity that is most similar to that equipment and for which a certification examination is available.***

(7) Issue a certification under this option that is portable and is valid for 5 years from date of issuance.

b. Option 2. Qualification by an audited employer program. The employer's qualification of its employee must meet the following requirements:

- ***NOTE: This "audited" option is associated with a 4-year phase-in period which Industry is working to meet because the Certified Auditor program training and auditing criteria are not yet available. However, until the 14 Nov 2014 deadline, to meet this Option 2, in lieu of a "Certified auditor that is not an employee of the employer", the employer's qualification of its employees may be performed by a "Qualified Person that may be an employee of the employer". In addition, the following must be met:***

(1) Successful completion of written and practical tests that are either developed by an accredited crane operator testing organization (see Option 1 above) or approved by an auditor (Qualified Person) in accordance with the following:

(a) The auditor (Qualified Person) is certified to evaluate such tests by an accredited crane operator testing organization (see Option 1 above);

(b) The auditor is not an employee of the employer (see note above);

(c) The approval must be based on the auditor's determination that the tests meet nationally recognized test development criteria and are valid and reliable in assessing the operator applicants' knowledge and skill needed;

(d) The audit must be conducted in accordance with nationally recognized auditing standards.

(2) The employer program shall be audited within 3 months of the beginning of the program and every 3 years thereafter;

(3) The employer program shall have testing procedures for recertification;

(4) Any significant deficiencies identified by the auditor shall be corrected prior to further qualification of any operators;

(5) Records of audits shall be retained for 3 years and made available to the GDA upon request;

(6) A qualification issued under this option:

(a) is not portable. Such a qualification meets the requirements of this Section only where the operator is employed by (and operating the equipment for) the employer that issued the qualification;

(b) is valid for 5 years from date of issuance.

c. Option 3. Qualification by the U.S. Military. An operator who is an employee of the U.S. military is considered qualified if he/she has a current operator qualification issued by the U.S. Military for operation of the equipment. An employee of the U.S. Military is a federal employee of the Department of Defense or Armed Forces and does not include employees of private contractors (this option includes USACE crane/derrick and hoist operators) and is further detailed in 16.B.04.

d. Option 4. Licensing by a State or Local Government Entity. A government (state or local) licensing department/office that issues operator licenses for operating equipment covered by this section is considered a government accredited crane operator testing organization provided the following criteria are met:

(1) The requirements for obtaining the license include assessment and determination via written and operational tests of the operator applicant's knowledge regarding safe operation of the specific type of equipment the individual will operate, including, at a minimum, the knowledge and skills listed in 16.B.04.b;

(2) The testing meets industry recognized criteria for written testing materials, practical examinations, test administration, grading, facilities/equipment and personnel;

(3) The government authority that oversees the examiners has determined that the requirements for Option 4 licensing have been met;

(4) The examiner has testing procedures for recertification designed to ensure that the operator continues to meet the technical knowledge and skills requirements;

(5) A license issued by a government accredited crane operator testing organization that meets the requirements of this operation:

(a) meets the operator qualification requirements of this section for operation of equipment only within the jurisdiction of the government entity; and

(b) is valid for the period of time stipulated by the licensing department/office but no longer than 5 years.

16.B.04 USACE/U.S. Military Operator Qualification (to include DOD civilians).

a. Qualification of operators that fall under this option can be performed in several ways or by a combination of two more of the options below:

(1) Each crane/derrick operator can be trained, tested and certified by a nationally accredited testing organization, see Option 1 above, OR

(2) Each operator can be trained, tested and licensed/qualified by a professional source that qualifies crane operators as long as the program is an audited one (see Option 2 above – this requirement will remain until 14 Nov 2014 whereupon this option will be replaced by one that is required to be 3rd party audited by a certified auditor; OR

(3) Each operator can be trained, tested and licensed by a government accredited crane/derrick operator examiner. An examiner that issues operator licenses for operating equipment covered by Section 16 is considered a government accredited crane/derrick operator examiner if he/she meets the criteria below:

(a) The potential in-house examiner must be nominated in writing by the individual's Command, his/her qualifications submitted to, reviewed by and approved by the USACE National Crane/Rigging Working Group, whereupon he/she becomes a government-accredited examiner;

(b) The examiner shall receive training by a training source for each type/class of crane he is responsible for testing others on, and shall then be licensed/certified by:

(i) An accredited crane operator testing organization (see Option 1) for each type and class of crane he is responsible for testing others on; OR

(ii) Qualified by a professional source that qualifies crane operators as long as the program is an audited one (see Option 2 above – this requirement will remain until 14 Nov 2014 whereupon this option will be replaced by one that is required to be 3rd party audited by a certified auditor.

b. The examiner shall examine and license the Command's crane operators in accordance with the identified criteria in this section.

c. The examiner and his program shall be audited by the USACE National Crane/Rigging Working Group at least every 3 years with documentation maintained.

d. The requirements for obtaining the license include assessment and determination via written and operational tests of the operator applicant's knowledge regarding safe operation of the specific type of equipment the individual will operate, including, at a minimum, the knowledge and skills listed below:

(1) The controls and operational/performance characteristics;

(2) Use of, and the ability to calculate (manually or with a calculator), load/capacity information on a variety of configurations of the equipment;

(3) Responsibilities of operator, rigger, signalpersons, and lift supervisor;

(4) Knowledge of OSHA and USACE crane safety requirements (including any incorporated changes/materials) and the crane operator's manual (to include the ability to read and locate relevant information in the operator's manual);

(5) Ability to determine the crane configuration, determine size and shape of loads, and the crane's applicable capacity using the load chart;

(6) Use and limitations of crane safety devices and operator aids (practical exam);

(7) Inspection, testing, and maintenance requirements;

(8) Technical knowledge applicable to the suitability of supporting ground and surface to handle expected load (practical exam);

(9) Technical knowledge applicable to identification of site hazards and site access conditions (practical exam);

(10) Outrigger and matting requirements (as applicable);

(11) Crane set-up, assembly, dismantling, and demobilization procedures (practical exam);

(12) Procedures for preventing and responding to power line contact;

(13) Signaling and communication procedures;

(14) Factors that reduce rated capacity;

(15) Ability to recognized, from visual and auditory observation, the items listed in the shift inspection items in 16.D.08 (practical exam);

(16) Operational and maneuvering skills (practical exam);

(17) Application of load chart information (practical exam); and

(18) Application of safe shut-down and securing procedures (Emergency control skills, practical exam).

e. The testing meets employer-recognized criteria for written testing materials, practical examinations, test administration, grading, facilities/equipment and personnel.

f. The government authority that oversees the examiners (USACE uses National Crane/Rigging Working Group) has determined that the requirements for licensing have been met;

g. The examiner has testing procedures for recertification designed to ensure that the operator continues to meet the technical knowledge and skills requirements;

h. An operator is deemed qualified to operate a particular piece of equipment for that specific class, type and capacity of equipment (or for any capacity equipment of that type and class tested on). The operator's qualification must state the type, class and capacity of equipment on which the operator was qualified (i.e., Mobile Crane, hydraulic boom, 30 T capacity);

i. Qualification under this option is:

(1) Not portable. Such a qualification meets the requirements of this section only where the operator is employed by (and operating the equipment for) the government entity that issued the qualification; AND

(2) Is valid for 5 years from date of issuance.

16.B.05 Operator Physical Qualifications/Examination. All crane/derrick operators shall be physically qualified to operate the equipment. Physical

examinations for operators are required to be conducted every 2 years and any time a condition is observed that may impact safe operation. Written proof, signed by a physician stating that the operator has had a physical examination and meets the medical requirements set forth below shall be submitted to the GDA for acceptance prior to allowing an operator to operate the equipment.

- ***Note: Operators of Hoisting Equipment are exempt from this requirement UNLESS this equipment is used to hoist/lift personnel. This activity is considered a Critical Lift and as such, requires a physical examination for the operator. See also 16.A.01.i and Section 16.U;***

a. Operators shall have a current physician's certification, dated within the past 2 years, that states the operator meets the following physical qualifications:

(1) Vision of at least 20/30 Snellen in one eye and 20/50 in the other, with or without corrective lenses;

(2) Normal depth perception and field of vision;

(3) Ability to distinguish colors, regardless of position;

(4) Adequate hearing, with or without hearing aid, for the specific operation;

(5) Sufficient strength, endurance, agility, coordination, manual dexterity, and speed of reaction to meet the demands of equipment operation;

(6) No tendencies to dizziness or similar undesirable characteristics; and

b. Evidence of physical defects, emotional instability that could render a hazard to the operator, others, or safe operation of the equipment, or evidence that the operator is subject to seizures or loss of physical control shall be sufficient reason for disqualification. In such cases, specialized medical tests may be required to evaluate these conditions and determine their impact.

c. All contractor crane/derrick operators shall participate in a drug testing program and have a negative result for a substance abuse test. The level of testing will be in accordance with standard practices for industry or by the agency's random drug testing program. This test will be confirmed by a recognized laboratory service.

16.B.06 Signal Person Qualifications.

a. All signal persons must be qualified by either a third party Qualified Evaluator or the employer's Qualified Evaluator.

b. Documentation must be provided by the Evaluator and must specify each type of signaling (e.g., hand signals, radio signals, etc.) for which the signal person meets the requirements of this section.

c. If subsequent actions by the signal person indicate that the individual does not meet the qualification requirement of this section the employer must not allow the individual to continue working as a signal person until retraining is provided and a re-assessment is made.

d. The qualification means that the Evaluator has assessed the individual's capabilities and has determined that the signal person has met the qualification requirements below:

(1) Know and understand the type of signals used (radio, cell, hand, etc). If hand signals are used, the signal person must know and understand the Standard Method for hand signals;

(2) Be competent in the application of the type of signals used;

(3) Have a basic understanding of crane operation and limitations, including crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads;

(4) Demonstrate that he/she meets the requirements above through a written and practical test.

e. An assessment by an employer's Qualified Evaluator is not portable other employers are not permitted to use it to meet these requirements.

16.C. CLASSIFICATION OF USACE EQUIPMENT AND TRAINING OF USACE OPERATORS

➢ ***Note: Operator qualifications/licenses detailed below are only valid provided operator receives annual refresher training as required below.***

16.C.01 Designated personnel must be qualified to operate a particular Class (i.e., mobile, tower, overhead, etc.) and type (lattice boom, hydraulic boom, etc.) of crane or hoist and the training provided shall be applicable to that Class and type of crane or hoist. The USACE classification of cranes and hoisting equipment and their associated training requirements are identified here. All exams shall meet the applicable parts of Option 3, based on type of equipment.

a. Class I (and type): Class I cranes are fixed cab telescopic hydraulic mobile cranes; swing cab telescopic hydraulic mobile cranes; lattice boom, truck or crawler cranes; cab operated overhead, bridge, gantry and under hung monorail cranes under or over 100 tons; remote controlled overhead, bridge, gantry under hung monorail cranes; hammerhead cranes; portal cranes; tower cranes; derricks post or stiff leg type; floating or barge mounted cranes and derricks, temporarily or permanently mounted:

(1) Class I operators are qualified to operate, perform preventive maintenance and inspection of this equipment as required;

(2) Training must be, as a minimum:

(a) Initial: 24-hour training with successful completion (passed) written and practical/operational examinations;

(b) Annual: 8-hour refresher training, with successful completion (passed) of written and practical/operational examination.

b. Class II: Class II cranes are overhead, bridge and gantry cranes, underhung, monorail, pedestal, and wall-mounted jib cranes, and similar equipment used for lifting and lowering continually guided loads.

(1) Class II crane operators are qualified to operate, perform preventive maintenance and inspection as required.

(2) Class II training, must be, as a minimum:

(a) Initial: 2-hour training with successful completion (passed) of written and practical/operational examinations;

(b) Annual: 1-hour refresher training with successful completion (passed) of written and practical/operational examination.

c. Class III Hoisting Equipment and shop equipment used for lifting or lowering a freely suspended (unguided) loads.

- ***Note 1: Refer to Paragraph 16.A.01.h, for exemption of equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2,000 pounds or less (exempt from the requirements in 16.B.02 through 16.B.06 only). It is anticipated that operator of this equipment will review manufacturer's instructions for proper operation however. This equipment shall not be used for hoisting personnel.***

- ***Note 2: Note 2: Operators of Class III Hoisting Equipment are exempt from 16.B.05, Physical Examination requirements UNLESS this equipment is used to hoist/lift personnel. This activity is considered a Critical Lift and as such, requires a physical examination for the operator. See also 16.A.01.i, 16.B.05 and Section 16.U;***

(1) Class III operators are qualified to operate, perform preventive maintenance and inspection of this equipment as required.

(2) Class III training, must be on the specific type(s) of hoist operated and be, as a minimum:

(a) Initial: 2-hour training with successful completion (passed) of written and practical/operational examinations;

(b) Annual: 1-hour refresher training with successful completion (passed) of written and practical/operational examination.

16.C.02 Prior to re-issuance of qualification, crane and hoisting equipment operators must have attended applicable training (initial and annual) and passed the written and operational examination requirements specified above.

16.C.03 Each USACE activity or operating project will maintain a current list of operators, complete crane and hoisting equipment training records for each operator, and a list of each class and type of equipment that each operator is qualified to operate.

16.D INSPECTION CRITERIA for CRANES and HOISTING EQUIPMENT

16.D.01 Inspections of cranes and hoisting equipment shall be in accordance with this section, applicable ASME standards, OSHA regulations and the manufacturer's recommendations.

16.D.02 Records of all crane and hoisting equipment tests and inspections shall be maintained onsite. Contractors shall make these records readily available upon request and, when submitted, they shall become part of the official project file.

16.D.03 Contractor shall provide the GDA 24-hours notice in advance of any crane or hoisting equipment entering the site (prior to inspection/tests) so that observation of the Contractor's inspection process and spot checks may be conducted.

16.D.04 Whenever any crane and/or hoisting equipment is found to be unsafe, or whenever a deficiency that affects the safe operation of a crane and/or hoisting equipment is observed, the affected equipment shall be immediately taken out of service and its use prohibited until unsafe conditions have been corrected.

16.D.05 Cranes and derricks in regular service. Inspection procedures for cranes/derricks in regular service are divided into three general classifications based on the intervals at which inspections shall be performed. The intervals depend on the nature of critical components of the crane and the degree of their exposure to wear, deterioration, or malfunction. The three general classifications are Periodic, Start-up, and Frequent, with respect to intervals between inspections as defined.

16.D.06 Inspection Frequency. Required inspection frequency shall be as per Table 16-1.

16.D.07 Initial Inspections. Prior to use, all new, re-assembled, modified or altered cranes, derricks or hoisting equipment (as applicable) that have had modifications or additions which affect the safe operation of the

equipment (i.e., involving a safety device, operator aid, critical part of a control system, power plant, braking system, load-sustaining structural components, load hook or in-use operating mechanism) or capacity shall be inspected by a qualified person.

a. Any deficiencies shall be carefully examined and a determination made as to whether they constitute a hazard.

b. The inspection shall include functional testing.

16.D.08 Start-Up Inspections (Pre-Operational, Each shift). Before every crane or derrick operation (at beginning of each shift) or following a change of operator, a competent person shall visually inspect the items listed below. The daily inspection must be documented and shall include the results of the inspection, name and signature of the person who conducted the inspection and the date of the inspection. Documentation shall be maintained for a minimum of 3 months, or the life of the contract, whichever is longer:

a. Control mechanisms for proper operation;

b. Brake actions to ensure brakes are functioning normally and that there is no slippage, excessive play, or binding. Exercise brakes to assure they are dry;

c. Control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter;

d. Operator aids and other safety devices for proper functioning and accuracy of settings;

e. Chords and lacing for damage, bent members, cracked welds, etc.;

f. Hydraulic and pneumatic systems for deterioration or leakage - with particular emphasis given to those that flex during normal operation;

g. Hooks and latches for deformation, chemical damage, cracks, and wear;

h. Rope for proper spooling onto the drum(s) and sheave(s) and rope

reeving for compliance with crane or derrick manufacturer's specifications;

i. Electrical apparatus for proper functioning, signs of excessive deterioration, dirt, and moisture accumulation;

j. Tires (when in use) for recommended inflation pressure and condition;

k. Ground conditions around the equipment for proper support, including ground settling under and around outriggers and supporting foundations, ground water accumulation, or similar conditions;

l. Hydraulic system for proper fluid level;

m. The equipment for level position: prior to each shift and after each move and setup;

n. Operator cab windows for significant cracks, breaks or other deficiencies that would hamper the operator’s view;

o. Safety devices and operational aids for proper operation;

p. Wedges and supports for looseness or dislocation (climbing tower cranes);

q. Braces and guys supporting crane masts for safe condition and proper tension; anchor bolt base connections for tightness or retention of preload; wedges and supports of climbing cranes for tightness and proper positioning;

r. For derricks, inspect all chords and lacing, tension in guys, plumb of the mast, and derrick mast fittings and connections for compliance with manufacturer’s recommendations;

s. Barge or pontoon ballast compartments for proper ballast; deck loads for proper securing; chain lockers, storage, fuel compartments, and battening of hatches; firefighting and lifesaving equipment in place and functional; hull void compartments sounded for leakage (floating cranes and derricks); and

t. Wire rope per 16.D.12.

TABLE 16-1

CRANE & DERRICK INSPECTION FREQUENCY

When to inspect	Type of Inspection
Prior to initial use - all new cranes [(a)]	Initial inspection
Prior to use - all altered cranes [(b)]	Initial inspection
Prior to initial use on a USACE project [(c)]	Periodic inspection
Monthly after initial use on a USACE project	Frequent inspection
Prior to every operation (shift)	Start-up inspection
Before using a crane that is not in use on a regular basis and that has been idle for more than 1 month, but less than 6 months [(d)]	Frequent inspection
Before using a crane that is not in use on a regular basis and that has been idle for more than 6 months [(d)]	Periodic inspection
Standby cranes, at least semi-annually [(e)]	Frequent inspection
Standby cranes, prior to use [(f)]	Frequent inspection

Notes:
(a) Performed by the manufacturer.
(b) "Altered" is defined as any change to the original manufacturer's design configuration, that is, replacement of weight handling equipment parts and components.
(c) Initial use refers to (1) the first time the USACE takes possession of a crane, or (2) whenever a Contractor brings a crane onto a job site.
(d) This requirement is in addition to the requirement for a periodic inspection.
(e) Standby cranes are those cranes that are not used on a regular basis but are available - on a standby basis - for emergencies (e.g., emergency operations & maintenance (O&M) work); requirements for frequent inspections of standby cranes are in addition to the requirement for a periodic inspection.
(f) In addition to the semi-annual frequent inspection, a frequent inspection shall be conducted prior to use

16.D.09 Frequent Inspections (Monthly intervals). Each month the equipment is in service, it shall be inspected according to the criteria in 16.D.08 for pre-operational/shift inspection.

a. The inspection must be documented and shall include the results of the inspection, name and signature of the person who conducted the inspection and the date of the inspection. Documentation shall be maintained for a minimum 12 months or for the life of the contract, whichever is longer.

b. Equipment shall not be used until this inspection demonstrates that no corrective action is required.

16.D.10 Periodic Inspections/Comprehensive (at least annually or as recommended by the manufacturer). This inspection shall include functional testing to determine that the equipment as configured in the inspection is functioning properly.

a. If any deficiency is identified, an immediate determination shall be made by the qualified person as to whether the deficiency constitutes a safety hazard. If so, then the equipment shall be removed from service until it has been corrected. If not yet a safety hazard, the qualified person may determine that the employer shall monitor the deficiency in the monthly inspections.

b. The comprehensive inspection must be documented and shall include items checked and results of inspection, name and signature of the person who conducted the inspection and the date and this documentation must be retained until at least the next annual/comprehensive inspection occurs, or 12 months, whichever is longer.

c. The following, in addition to those items required by a pre-operational inspection in 16.D.08 above, shall be inspected by a qualified person:

(1) Equipment structure – to include boom and, if equipped, the jib;

(2) Bolts, rivets, and other fasteners for tightness, corrosion;

(3) Welds for cracks;

(4) Proper tension (torque) of high strength (traction) bolts used in connections and at the slewing bearing;

(5) Power plants for performance and compliance with safety requirements;

(6) Drive components such as pins, bearings, wheels, shafts, gears, sheaves, drums, rollers, locking and clamping devices, sprockets, drive chains or belts, bumpers, and stops for absence of wearing, cracks, corrosion, or distortion;

(7) All crane function operating mechanisms for proper operation, proper adjustment, and the absence of unusual sounds;

(8) Travel, steering, holding, braking, and locking mechanisms for proper functioning and absence of excessive wear or damage;

(9) Hydraulic, pneumatic and other pressurized hoses, fittings and tubing for leaks, deformation or other signs of failure/impending failure, abrasion or scrubbing;

(10) Hydraulic and pneumatic pumps and motors for performance indicators (noises, vibration low operating speed, excessive heating of the fluid, low pressure, etc.), loose bolts or fasteners, seals and joints between pump sections for leaks, Tires for damage or excessive wear;

(11) Hydraulic and pneumatic valves (Spools – sticking, Leaks, Valve housing cracks, Relief valves – failure to reach correct pressure);

(12) Hydraulic and pneumatic cylinders for: drifting; rod seals and welded joints for leaks; cylinder rods for scores, nicks or dents; barrel for significant dents; rod eyes and connecting joints for looseness and deformity;

(13) Brake and clutch system parts, linings, pawls, and ratchets for excessive wear;

(14) Wire rope per 16.D.12;

(15) Sheaves and drums for cracks or significant wear;

(16) Crane operator aids and safety devices and indicating devices for proper operation, to include accuracy;

(17) A means to verify the proper setup of the boom stops and functioning of the boom hoist disengaging device. This test will be conducted before initiating the operational test required by 16.F;

(18) Motion limiting devices for proper operation with the crane unloaded (each motion should be inched into its limiting device to run in at slow speed with care exercised) and load limiting devices for proper operation and accuracy of settings;

(19) Safety and function labels for legibility and replacement;

(20) For floating plant, inspect ballast compartments for proper ballast; deck loads for proper securing; safety of chain lockers, storage, fuel compartments; battening of hatches; hull void compartments sounded for leakage; tie-downs for barge-mounted land cranes for wear, corrosion, and tightness; cleats, bitts, chocks, fenders, capstans, ladders, stanchions for corrosion, wear, deterioration, and deformation; take four corner draft readings;

(21) Outrigger pads/floats and slider pads for excessive wear and cracks;

(22) Electrical components and wiring for cracked or split insulation and loose or corroded terminations;

(23) Operator seat – missing or unusable;

(24) Originally equipped steps, ladders, handrails, guards – missing;

(25) Steps, ladders, handrails, guards in unusable or unsafe condition.

16.D.11 Inspection of cranes, derricks and other hoisting equipment not in regular use shall be inspected as follows:

a. Frequent (Monthly) Inspection Criteria (see 16.D.09) – Cranes or hoisting equipment that have been idle for a period of one month or more, but less than one year;

b. Periodic (Annual/Comprehensive) Inspection Criteria (see 16.D.10) – Cranes or hoisting equipment that have been idle for a period of one year or more;

c. Cranes or hoisting equipment that are exposed to adverse environmental conditions shall be inspected more frequently, as determined by a qualified person (of GDA or the Contractor) with the concurrence of GDA.

16.D.12 Wire Rope Inspection, Maintenance and Replacement.

a. A competent person shall perform this inspection for each shift, visually inspecting all running ropes and counterweight ropes and load trolley ropes, if provided. Visual inspection shall concentrate on identifying apparent deficiencies in wire rope as categorized below. Opening of wire rope or booming down is not required as part of this inspection.

b. Category I. Apparent deficiencies in this category include the following:

(1) Distortion of wire rope structure such as kinking, crushing, unstranding, birdcaging, main strand displacement, core failure or protrusion between the outer strands;

(2) General corrosion;

(3) Electric arc (from a source other than power lines) or heat damage;

(4) Severely corroded or broken wires at end connections; severely corroded, cracked bent, worn, or improperly applied end connections;

c. Category II. Apparent deficiencies in this category include the following:

(1) Number, distribution and type of visible broken wires are as per IPT's Crane and Rigging training Manual;

(2) A diameter reduction of more than 5% from nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.

d. Category III. Apparent deficiencies in this category include the following:

(1) Core failure or protrusion in rotation resistant ropes;

(2) Electrical contact with a power line; OR

(3) A broken strand (care shall be taken when inspecting rotation resistant ropes because of their susceptibility to damage from misuse and potential for deterioration when used on equipment with limited design parameters).

e. Critical Review Items. Particular attention should be given to:

(1) Rotation resistant wire rope in use;

(2) Boom hoist ropes and sections of rope subject to rapid deterioration such as at flange points, crossover points, and repetitive pickup points on drums;

(3) Sections in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited;

(4) Sections of the rope at or near terminal ends where corroded or broken wires may protrude; AND

(5) Sections subject to reverse bends and sections normally hidden during routine visual inspections, such as parts passing over outer sheaves.

f. Removal from Service.

(1) If a Category I deficiency is identified, an immediate determination shall be made by the competent person as to whether the deficiency constitutes a safety hazard. If so, operations involving the use of the wire rope in question shall be prohibited until:

(a) The wire rope is replaced; OR

(b) If the deficiency (other than power line contact) is localized and the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. Repair of wire rope that contacted an energized power line is also prohibited.

(2) If a Category II deficiency is identified, one of the following actions must occur:

(a) Employer shall consider the deficiency to constitute a safety hazard where it meets the wire rope manufacturer's established criterion for removal from service or meets a different criterion that the wire rope manufacturer has approved in writing for that specific wire rope. If the deficiency is considered a safety hazard, operations involving use of the wire rope shall be prohibited until the wire rope is either replaced OR the damage is removed in accordance with 16.D.12.f(1)(b), OR

(b) Institute alternative measures. The wire rope may continue to be used if the employer ensures that the following measures are implemented:

(i) A qualified person assesses the deficiency in light of the load and other conditions of use and determines it is safe to continue to use the wire rope as long as the conditions established under this paragraph are met;

(ii) A qualified person establishes the parameters for the use of the equipment with the deficiency, including a reduced maximum rated load;

(iii) A qualified person establishes a specific number of broken wires, strands or diameter reduction that, when reached, will require the

equipment to be taken out of service until the wire rope is replaced or the damage is removed in accordance with 16.D.12.f(1)(b);

(iv) a qualified person sets a time limit, not to exceed 30 days from the date the deficiency is first identified, by which the wire rope must be replaced, or the damage removed in accordance with 16.D.12.f(1)(b).

(3) If a Category III deficiency is identified, operations involving the use of the wire rope in question shall be prohibited until:

(a) The wire rope is replaced; OR

(b) If the deficiency (other than power line contact) is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wore rope by splicing is prohibited. Repair of wire rope that contacted an energized power line is also prohibited.

16.E SAFETY DEVICES AND OPERATIONAL AIDS

Safety devices and operational aids shall not be used as a substitute for the exercise of professional judgment by the operator.

16.E.01 Safety Devices. The following safety devices are required on all cranes and derricks covered by Section 16 unless otherwise specified.

a. Crane level indicator.

(1) The equipment shall have a crane level indicator that is either built into the equipment or is available on the equipment.

(2) If a built-in crane level indicator is not working properly, is shall be tagged-out or removed.

(3) This requirement does not apply to portal cranes, derricks, floating cranes/derricks and crane/derricks on barges, pontoons, vessels or other means of flotation.

b. Boom stops, except for derricks and hydraulic booms.

c. Jib stops (if jib is attached), except for derricks.

d. Equipment with foot pedal brakes shall have locks, except for portal and floating cranes.

e. Hydraulic outrigger jacks shall have an integral holding device (check valve).

f. Equipment on rails shall have rail clamps and rail stops, except for portal cranes.

g. Horn.

16.E.02 Proper Operation of Safety Devices. Operations shall not begin unless the safety devices listed above are in proper working order. If a safety device stops working properly during operations, the operator shall safely stop operations. Operations shall not resume until the device is again working properly. Alternative measures are not permitted to be used.

16.E.03 Operational Aids.

a. The devices listed here are required on all cranes and derricks covered by Section 16 unless otherwise specified.

b. Operations shall not begin unless the listed operational aids are in proper working order except where the employer meets the specified temporary alternative measures. More protective alternative measures specified by the crane/derrick manufacturer, if any, shall be followed.

c. If a listed operational aid stops working properly during operations, the operator shall safely stop operations until the temporary alternative measures are implemented or the device is again working properly. If a replacement part is not longer available, the use of a substitute device that performs the same type of function is permitted and is not considered a modification.

d. Category I operational aids and alternative measures. Operational aids listed in this paragraph that are not working properly shall be repaired not later than 7 days after the deficiency occurs. EXCEPTION: If the employer documents that it has ordered the necessary parts within 7 days of the occurrence of the deficiency, the repair shall be completed within 7 days of receipt of the parts.

(1) Boom hoist limiting device. TEMPORARY alternative measures (use at least one):

(a) Use a boom angle indicator;

(b) Clearly mark the boom hoist cable, in a visible location to the operator, at a point that will give the operator sufficient time to stop the hoist to keep the boom within the minimum allowable radius. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark;

(c) Clearly mark the boom hoist cable, in a visible location to the spotter, at a point that will give the spotter sufficient time to signal the operator and have the operator stop the hoist to keep the boom within the minimum allowable radius.

(2) Luffing jib limiting device.

(a) Equipment with a luffing jib shall have a luffing jib limiting device.

(b) Temporary alternative measures are the same as in 16.E.03.d(1)(a) except to limit the movement of the luffing jib.

(3) Anti two-blocking device (A2B). Anti-two blocking devices shall be installed at all points of two-blocking.

(a) All cranes and derricks shall be equipped with A2B/Hoist-limit device that will disengage the function that is causing the two-blocking or an A2B damage prevention feature (except as noted). They shall be tested and certified functional by a competent person prior to operating the crane.

(b) Lattice boom cranes. Lattice boom cranes shall be equipped with an A2B device to stop the load hoisting and boom-down functions before the load block or load contacts the boom tip.

➢ ***EXCEPTION 1 – Duty Cycle: Lattice boom cranes that are used exclusively for duty cycle operations are exempt from A2B equipment requirements. When a lattice boom crane engaged in duty cycle work is required to make a non-duty cycle lift (for example, to lift a piece of equipment), it will be exempt from the A2B equipment requirements if the following procedures are implemented:***

- An international orange colored warning device (flag, tape or ball) is properly secured to the hoist line at a distance of 8 ft to 10 ft (2.4 m to 3m) above the rigging;

- The signal person acts as a spotter to alert the crane operator with a "STOP" signal when the warning device approaches the boom tip and the crane operator ceases hoisting functions when alerted of this;

- While the non-duty cycle lift is underway the signal person shall not stand under the load, shall have no duties other than as a signal person, and shall comply with the signaling requirements of this manual.

➢ ***EXCEPTION 2 – Lattice boom cranes with manually operated friction brakes: Lattice boom crane and hoisting equipment with manually activated friction brakes, A2B warning devices may be used in lieu of A2B prevention devices.***

(c) Telescopic boom cranes.

(i) Telescopic boom cranes shall be equipped with an A2B device to stop the load hoisting function before the load block or load contacts the boom tip and to prevent damage to the hoist rope or other machine components when extending the boom.

(ii) Telescopic boom cranes that are used exclusively for duty cycle operations shall be equipped with a two-blocking damage prevention feature or warning device to prevent damage to the hoist rope or other machine components when extending the boom.

(d) Floating cranes. Floating cranes may use an A2B alarm system in lieu of a disengaging device unless they are hoisting personnel.

(e) Other cranes used in duty cycle operations, to include clamshell (grapple), magnet, drop ball, container handling, concrete bucket, pile driving and extracting operations, drilled shaft operations (except telescopic boom cranes, see 16.E.03.d(3)(c)(2)), are exempt from the requirements for A2B devices.

(f) Temporary alternative measure: clearly mark the cable (so that it can be easily seen by the operator) at a point that will give the operator

sufficient time to stop the hoist to prevent two-blocking and use a spotter when extending the boom.

(4) Wind speed indicating device mounted on the crane, in a location where the maximum wind speed can be measured for the lifting activity. Temporary alternative measure: a hand-held anemometer used where the maximum wind speed can be measured using this device;

e. Category II operational aids and alternative measures. Operational aids listed in this paragraph that are not working properly shall be repaired not later than 30 days after the deficiency occurs.

- ***EXCEPTION: If the employer documents that it has ordered the necessary parts within 7 days of the occurrence of the deficiency, and the parts are not received in time to complete the repair in 30 days, the repair shall be completed within 7 days of receipt of the parts.***

(1) Boom angle or radius indicator. The equipment (does not apply to articulating cranes or digger derricks manufactured before November 8, 2011) shall have a boom angle or radius indicator readable from the operator's station. Temporary alternative measures: radii or boom angle shall be determined by measuring the radii or boom angle with a measuring device. Calibration and testing of indicators will be performed in accordance with the manufacturer's recommendations.

(2) Jib angle indicator (if equipment has luffing jib; does not apply to articulating cranes). Temporary alternative measures: radii or jib angle shall be determined by ascertaining the main boom angle and then measuring the radii or jib angle with a measuring device.

(3) Boom length indicator (does not apply to articulating cranes) if the equipment has a telescopic boom, except where the load rating is independent of the boom length. Temporary alternative measures: one of the following methods shall be used:

(a) Mark the boom with measured marks to calculate boom length;

(b) Calculate boom length from boom angle and radius measurements; OR

(c) Measure the boom with a measuring device.

(4) Load weighing and similar devices. Equipment, (does not apply to digger derricks manufactured prior to November 8, 2011), shall have at least one of the following: load weighing device, load moment indicator (LMI), rated capacity indicator or rated capacity limiter. Temporary alternative measures: The weight of the load shall be determined from a reliable source (i.e., load manufacturer), by a reliable calculation method (i.e., calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. This information shall be provided to the operator prior to the lift.

- ***EXCEPTION: When cranes are used in duty cycle operations they are exempt from the requirements for load indicating devices and LMI devices.***

(5) Hoist drum rotation indicator if the drum is not visible from the operator's station. Temporary alternative measures: mark the drum. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.

(6) Outrigger position (horizontal beam extension) sensor/monitor if the equipment has outriggers (required on equipment manufactured after January 1, 2008). Temporary alternative measure: the operator shall verify that the position of the outriggers is correct (in accordance with manufacturer's procedures) before beginning operations requiring outrigger deployment.

16.F TESTING

16.F.01 Written reports of tests, showing test procedures and confirming the adequacy of repairs or alterations, shall be maintained with the crane and hoisting equipment or at the on-site project office.

16.F.02 Operational Testing.

a. A qualified person shall conduct operational tests in accordance with ANSI/ASME and the manufacturer's recommendations. If the manufacturer has no procedures, the requirements in this section, as a minimum, must be performed.

b. Operational testing shall be performed:

(1) Before initial use of a crane or hoisting equipment after a load bearing or load controlling part or component, brake, travel component, or clutch (to include securing devices, skids and barges for floating cranes) has been altered, replaced, or repaired;

(2) Every time a crane or hoisting equipment(s) is reconfigured or re-assembled after disassembly (to include booms);

(3) Every time a crane and/or hoisting equipment is brought onto a USACE project; and

(4) Every year during periodic inspection.

c. Operational testing after the replacement of wire rope is not required.

d. Operational Testing, as a minimum, shall include the following:

(1) Load lifting and lowering mechanisms;

(2) Boom lifting and lowering mechanisms;

(3) Boom extension and retraction mechanisms;

(4) Swinging mechanisms;

(5) Travel mechanisms;

(6) Safety devices;

(7) Operational aids.

16.F.03 Load Testing. Load testing is considered a Critical Lift.

a. Load tests shall be performed under the direction of a qualified person in accordance with appropriate ANSI/ASME standards and the manufacturer's recommendations. At a minimum, the load test procedures shall include the following:

(1) Hoist the test load to ensure that the load is supported by the crane and held by the hoist brake(s);

(2) Swing the crane or derrick, if there are no physical restrictions, the full range of its swing, with the test load;

(3) Boom the crane up and down within the allowable working radius for the test load;

(4) Lower the test load and hold the load with the brake(s).

➢ ***NOTE: If the manufacturer is no longer in business and procedures are unavailable, a qualified person familiar with the type of equipment involved shall develop and approve procedures, which as a minimum, shall include those listed above.***

b. Load Testing shall be performed at 100 to 110% of the anticipated load for the specified configuration, not to exceed 100% of the manufacturer's structural load rating chart at the configuration of the test.

c. Load testing shall be performed:

(1) Before initial use of crane or hoisting equipment in which a load bearing or load controlling part or component, brake, travel component, or clutch has been altered, replaced, or repaired.

(2) Every time the crane or hoisting equipment is reconfigured or reassembled after disassembly (to include booms); and

(3) When the manufacturer requires load testing.

(a) The employer shall specifically research, identify and document manufacturer required load-testing frequency for each USACE-owned/operated and/or Contractor- owned/operated crane or hoisting equipment and maintain and/or provide this information to the GDA;

(b) Under conditions (1) and (2) above, a selective load test (testing only those components that have or may have been affected by the alteration, replacement, or repaired) may be performed;

(c) The replacement of the rope is specifically excluded from this requirement. However, a functional test of the crane or hoisting equipment under a normal operating load shall be made prior to putting the crane back in service.

d. The manufacturer's specifications and limitations applicable to the operation of any crane and hoisting equipment shall be followed. At no time shall a crane or hoisting equipment be loaded in excess of the manufacturer's rating, except overhead and gantry cranes in accordance with ANSI/ASME B30.2. Loads shall not exceed 125% of the rated load for test purposes or planned engineered lifts for overhead and gantry cranes. ***> See 16.H, Critical Lifts.***

(1) Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a registered engineer competent in this field, and such determinations will be documented and recorded.

(2) Attachments used with crane and hoisting equipment shall not exceed the capacity, rating, or scope recommended by the manufacturer.

e. Written reports that show test procedures and confirm the adequacy of repairs or alterations shall be maintained and provided upon request.

16.G OPERATION

16.G.01 All cranes and hoisting equipment shall have the following documents with them (in the cab, if applicable) at all times they are to be operated:

a. A copy of the operating manual developed by the manufacturer for the specific make and model of the crane or hoist.

(1) When not available from a manufacturer, a qualified person shall establish the ratings and operating limitations (load charts), recommended operating speeds, special hazard warnings, instructions and operators manual, maintenance, testing, and inspection requirements that apply during the use.

(2) Where load capacities are available only in electronic form: in the event of a failure which makes the load capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the load capacities (in electronic or other form) are available. A printed copy of the load capacities shall be maintained and available.

b. A copy of the load-rating chart (separate or included in the operating manual), shall include:

(1) The crane/hoist make and model, serial number, and year of manufacturer;

(2) Load ratings for all operating configurations, including optional equipment;

(3) Recommended reeving for the hoist line; and

(4) Operating limits in windy or cold weather conditions.

c. A durable load chart with legible letters and figures shall be readily available to the operator at the control station;

d. The crane log book shall be used to record operating hours and all crane inspections, tests, maintenance, and repair. The log shall be updated daily as the crane is used and shall be signed by the operator and supervisor. Service mechanics shall sign the log after conducting maintenance or repairs on the crane.

e. All inspections, test, maintenance and repairs for hoisting equipment shall be maintained in the log, the O&M records or equivalent for that piece of equipment.

16.G.02 No modifications or additions that affect the capacity or safe operation of cranes or hoisting equipment shall be made without the manufacturer's written approval.

a. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.

b. In no case shall the original safety factor of the equipment be reduced.

16.G.03 Hoisting wire ropes shall be installed in accordance with ANSI/ASME standards and the equipment manufacturer's recommendations.

a. Overhead and gantry cranes shall have at least two full wraps of wire rope on the drums at all times.

b. All other cranes shall have at least three full wraps (not layers) of wire rope on the drums at all times.

c. The drum end of the wire rope shall be anchored to the drum by an arrangement specified by the crane manufacturer.

16.G.04 Responsibilities.

a. The responsibilities of the operator shall include, but are not limited to the following requirements:

(1) The operator shall not engage in any activity that will divert his attention while operating the equipment;

(2) The operator shall not leave the controls while a load is suspended;

(3) Before leaving the crane or hoisting equipment unattended, the operator shall:

(a) Land any load, bucket, lifting magnet, or other device;

(b) Disengage the master clutch;

(c) Set travel, swing, boom brakes, and other locking devices;

(d) Put the controls in the “OFF” or neutral position;

(e) Secure the equipment against accidental travel; and

(f) Stop the engine.

(g) ***Exception:*** When crane operation is frequently interrupted during a shift and the operator must leave the crane. Under these circumstances, the engine may remain running and the following conditions (including those in paragraphs (a) thru (e) above) shall apply:

(i) The operator shall remain adjacent to the equipment and is not engaged in any other duties;

(ii) The competent person determines that it is safe to do so and implements measures necessary to restrain the boom hoist and telescoping, load, swing and outrigger functions;

(iii) The crane shall be located within an area protected from unauthorized entry.

(4) The operator shall respond to signals from the person who is directing the lift or an appointed signal person. When a signal person is not used in the crane operation, the operator shall ensure he has full view of the load and the load travel paths at all times the load is rigged to the crane and hoisting equipment;

(5) Each operator is responsible for those operations under his direct control. Whenever there is a concern as to safety, the operator shall have the authority to stop and refuse to handle loads until a qualified person has determined that safety has been assured.

b. The operator, qualified lift supervisor and rigger shall jointly ensure:

(1) The crane is level and, where necessary, blocked;

(2) The load is well secured and balanced in the sling or lifting device before it is lifted more than a few inches;

(3) The lift and swing path is clear of obstructions and adequate clearance is maintained from electrical sources per Table 16-2; and

(4) All persons are clear of the swing radius of the counterweight.

c. When two or more cranes (tandem lift is a critical lift) are used to lift one load, the lift supervisor shall be responsible for the following:

(1) Analyzing the operation and instruct all personnel involved in the proper positioning, rigging of the load, and the movements to be made;

(2) Making determinations as necessary to reduce crane ratings, load position, boom location, ground support, and speed of movement, which are required to safely make the lift;

(3) Ensuring that dedicated personnel are present and equipment is functioning properly. All personnel involved with the crane operation shall understand the communication systems and their responsibilities.

16.G.05 Communications.

a. A standard signal system shall be used on all cranes and hoisting equipment (by hand, voice, audible or comparable signals). Manual (hand) signals may be used when the distance between the operator and signal person is not more than 100 ft (30.4 m). If using hand signals, Standard Method must be used per Figure 16-1.

(1) Radio, telephone, or a visual and audible electrically-operated system shall be used when the distance between operator and signal person is more than 100 ft (30.4 m) or when they cannot see each other.

b. A signal person must be used in the following situations:

(1) When the point of operation, load travel, area near or at load placement, is not in full view of the operator;

(2) When the equipment is traveling and the view in the direction of travel is obstructed;

(3) Due to site specific safety concerns, either the operator or the person handling the load determines that it is necessary.

c. During crane operations requiring signals, the ability to transmit signals between the operator and signal person shall be maintained. If that ability is interrupted at any time, the operator shall safely stop operations requiring signals until it is reestablished and a proper signal is given and understood.

d. Only one person gives signals to a crane/derrick operator at a time unless an emergency stop signal is given (which may be given by anyone and must be obeyed by the operator).

16.G.06 Riding on loads, hooks, hammers, buckets, material hoists, or other hoisting equipment not meant for personnel handling is prohibited.

16.G.07 When practical and when their use does not create a hazard, tag lines shall be used to control loads.

16.G.08 Whenever a slack line condition occurs, the proper seating of the rope in the sheaves and on the drum shall be checked prior to further operations.

FIGURE 16-1

CRANE HAND SIGNALS

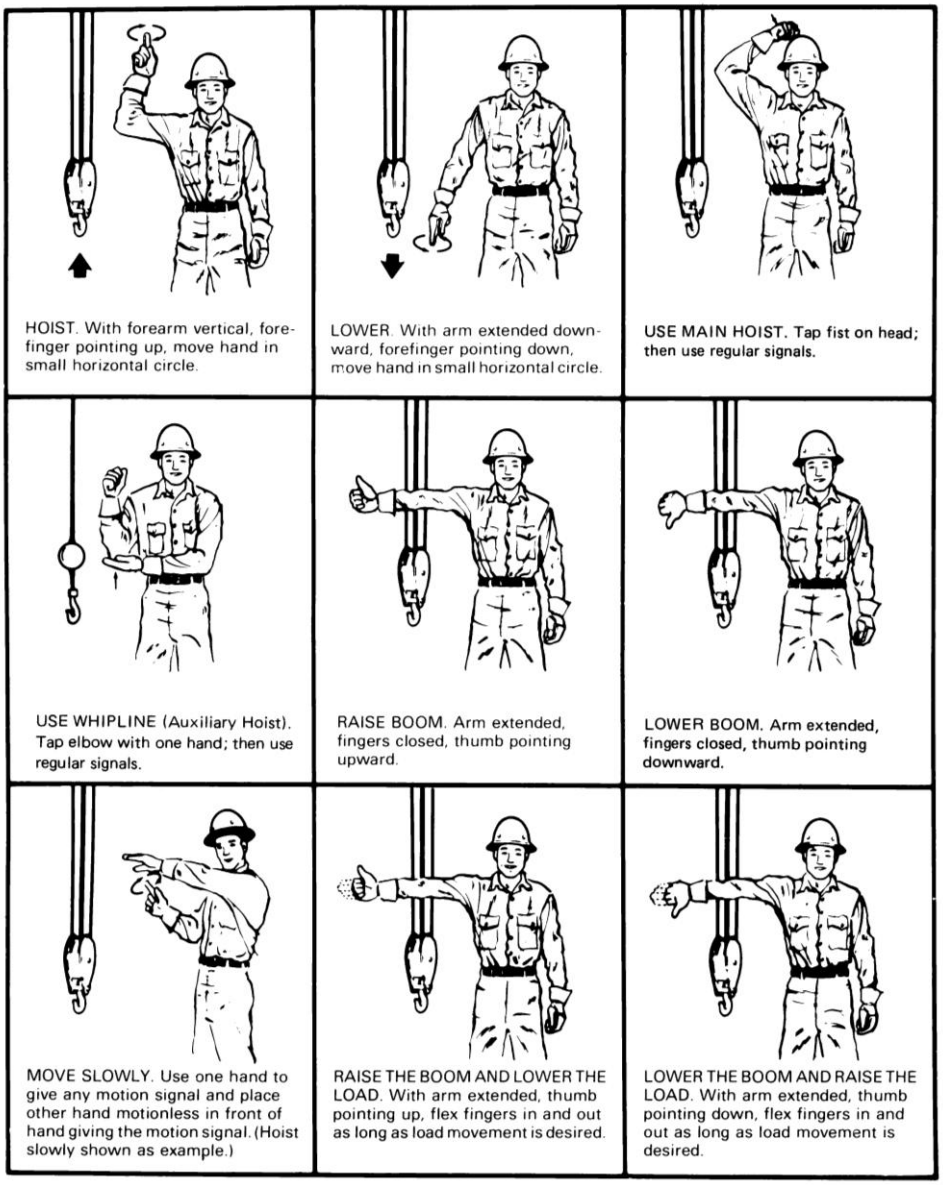


FIGURE 16-1 (Continued)

CRANE HAND SIGNALS

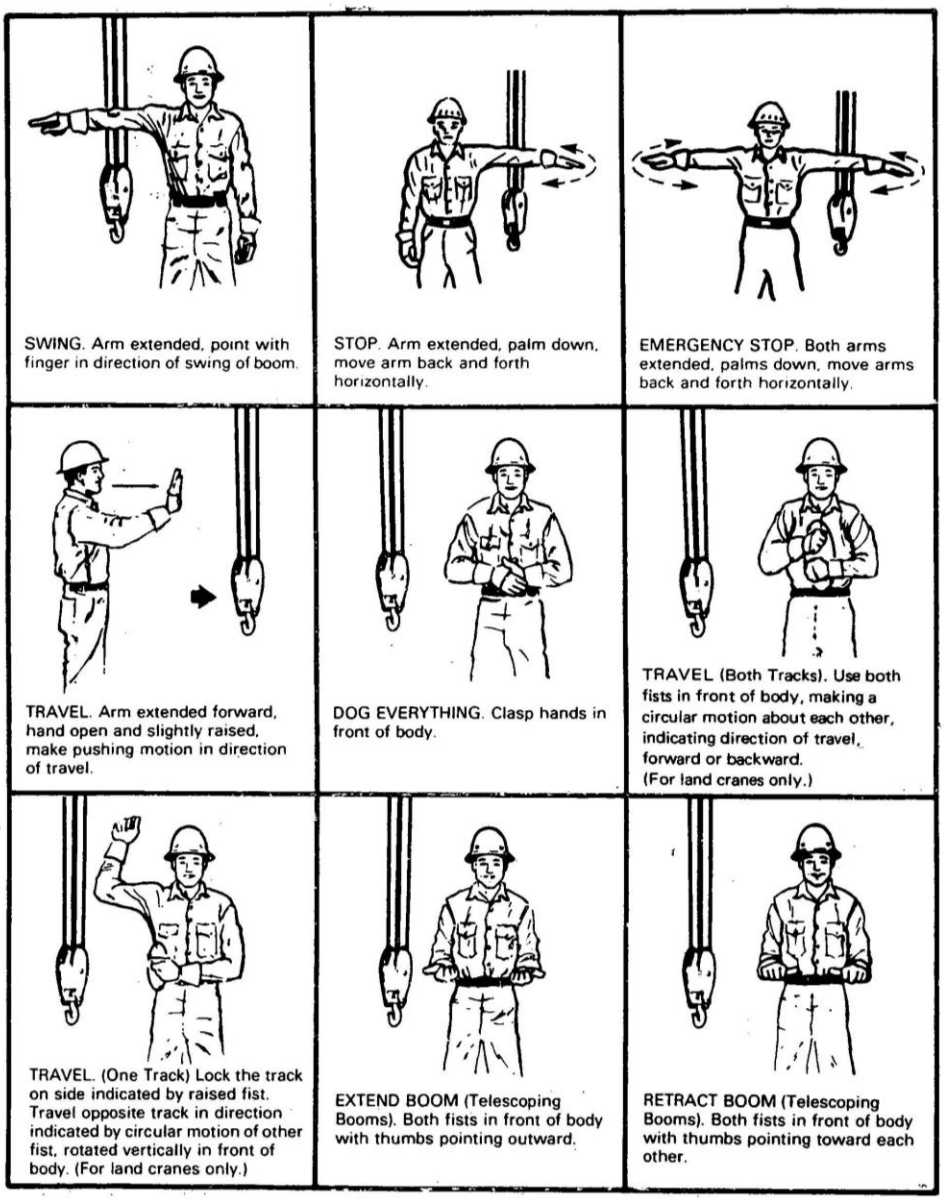
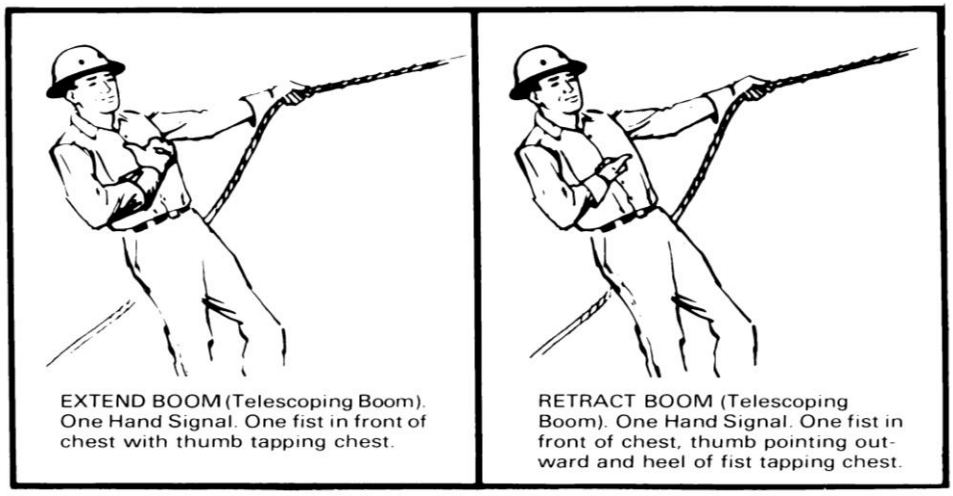


FIGURE 16-1 (Continued)

CRANE HAND SIGNALS



NOTE: Crane signals taken from ANSI/ASME B30 series standards with permission of ASME.

16.G.09 **Power line clearance- assembly/disassembly (up to 350 kV).** Before assembling or disassembling equipment, the employer must determine if any part of the equipment, load line, or load (including rigging and lifting accessories) could get closer than 20 feet (6 m) to a power line during this process. If so, one of the following requirements must be met:

a. De-energize and ground. Confirm from the utility owner/operator that the line has been de-energized and visibly grounded at the worksite.

b. 20 foot (6 m) clearance. Ensure no part of the equipment, load line or load gets closer than 20 ft (6 m) to the power line by implementing the following:

(1) Conduct a planning meeting with the assembly/disassembly (A/D) director, operator, A/D crew and the other workers who will be in the area. Review location of the power lines and the control measures to prevent encroachment/or electrocution;

(2) If tag lines are used, they must be non-conductive;

(3) In addition, at least one of the following must be in place:

(a) Use of a dedicated spotter who is in continuous contact with the operator;

(b) A proximity alarm set to give operator sufficient warning;

(c) A device that automatically limits range of movement, set to prevent encroachment;

(d) An elevated warning line, barricade or line of signs in view of the operator, equipped with flags or similar high-visibility markings.

c. Table 16-2 clearance.

(1) Determine the line's voltage and minimum clearance distance permitted under Table 16-2.

(2) Determine if any part of the equipment, load line, or load, could get closer that the minimum clearance distance to the power line permitted. If so, the control measures identified in paragraph b (above) shall be implemented.

d. A/D below power lines is prohibited unless employer has confirmed that lines are de-energized and visibly grounded.

e. A/D inside Table 16-2 clearance is prohibited unless employer has confirmed that lines are de-energized and visibly grounded.

f. At least one electrocution hazard warning conspicuously posted in the cab, in view of the operator and at least two on the outside of the equipment.

16.G.10 **Power line clearance – equipment operations (all voltages).** The employer must identify the work zone for the crane or hoisting equipment in question (work zone is the area 360 degrees around the crane, up to the crane's maximum working radius). A determination shall be made if any part of the crane, load line or load (to include rigging and lifting accessories), if operated up to the crane's maximum working radius

in the work zone, could get within 20 ft (6 m) of the power line one of the following must be met:

a. De-energize and ground. Confirm from the utility owner/operator that the line has been de-energized and visibly grounded at the worksite.

b. 20 foot clearance. Ensure no part of the equipment, load line or load gets closer than 20 ft (6 m) to the power line by implementing the following:

(1) Conduct a planning meeting with the assembly/disassembly director (A/D director), operator, A/D crew and the other workers who will be in the area. Review location of the power lines and the control measures to prevent encroachment/or electrocution.

(2) If tag lines are used, they must be non-conductive;

(3) Erect and maintain an elevated warning line, barricade or line of signs in view of the operator, equipped with flags or similar high-visibility markings, at 20 ft (6 m) from the power line or at a minimum approach distance under Table 16-2.

(4) In addition, at least one of the following must be in place:

(a) Use of a dedicated spotter who is in continuous contact with the operator. The spotter must have a visual aid to assist in identifying the minimum clearance distance (e.g., clearly visible line painted on the ground). The spotter should be positioned to effectively gauge the clearance distance;

(b) A proximity alarm set to give operator sufficient warning;

(c) A device that automatically limits range of movement, set to prevent encroachment.

(d) An elevated warning line, barricade or line of signs in view of the operator, equipped with flags or similar high-visibility markings;

(e) An insulating link/device installed at a point between the end of the load line (or below) and the load.

c. Table 16-2 clearance.

(1) Determine line's voltage and minimum clearance distance permitted under Table 16-2.

(2) Determine if any part of the equipment, load line, or load, while operating up to the equipment's maximum working radius in the work zone could get closer than the minimum clearance distance to the power line permitted. If so, the control measures identified in paragraph b above shall be implemented.

d. Permanently installed overhead and gantry cranes clearances shall be in accordance with NFPA 70;

e. When working near transmitter/communication towers where the equipment is close enough for an electrical charge to be induced in the equipment or materials being handled, the transmitter must be de-energized or provided with an electrical ground. Taglines, if used, shall be non-conductive.

f. It shall be assumed that all power lines are energized unless the utility owner/operator confirms that the power line has been and will continue to be deenergized and visibly grounded at the worksite.

g. Training. Each operator and crew member assigned to work with the equipment shall have received the following training:

(1) Procedures to follow in the event there is contact with the power line;

(2) Information regarding the danger of electrocution from the operator simultaneously touching the equipment and the ground;

(3) The importance to the operator's safety of remaining inside the cab except where there is an imminent danger of fire, or other emergency that necessitates leaving the cab;

(4) The safest means of evacuating from equipment that may be energized;

(5) The danger of the potentially energized zone around the equipment;

(6) The need for crew in the area to avoid approaching or touching the equipment and the load;

(7) Safe clearance distance from the power line;

(8) Power lines are presumed to be energized unless the utility owner/operator confirms that the power line is deenergized and visibly grounded;

(9) Power lines are presumed to be uninsulated unless the utility owner/operator or a registered engineer who is a qualified person confirms that a line is insulated;

(10) The limitations of an insulating link/device, proximity alarm, and range control (or similar) device if used;

(11) Equipment grounding procedures and the limitations thereof;

(12) Dedicated spotters must be trained to effectively perform their tasks. Including the applicable training previously identified herein.

16.G.11 **Power line safety - (over 350 kV).** The requirements of paragraphs 16.G.09 and 16.G.10 apply to power lines over 350 kV except:

a. For power lines over 350 kV but at or below 1000 kV, wherever the distance “20 feet (6 m)” is specified, the distance “50 feet (15 m)” must be substituted; and,

b. For power lines over 1000 kV, the minimum clearance distance must be established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution.

16.G.12 Power Line Safety While Traveling Under or Near Power Lines with NO Load. The employer must ensure that;

a. The boom/mast and its support system are lowered sufficiently to ensure clearances in Table 16-3 are maintained;

b. Effects of speed and terrain on equipment movement (including boom/mast) are considered to ensure clearances in Table 16-3 are maintained;

c. If any part of the equipment, while traveling will get closer than 20 ft (6 m) to the power line, a dedicated spotter must be used;

d. When traveling at night, or in conditions of poor visibility, in addition to the above, the employer must ensure that;

(1) the power lines are illuminated, or alternate methods are used to identify location of power lines;

(2) a safe path of travel is identified and used.

16.G.13 Physical clearances.

a. Adequate clearance shall be maintained between moving and rotating structures of the crane and hoisting equipment and fixed objects to allow the passage of employees without harm. The minimum adequate clearance is 24 in (61 cm).

b. Accessible areas within the swing radius of the rear of the crane and hoisting equipment's rotating superstructure, either permanently or temporarily mounted, shall be barricaded to prevent an employee from being struck or crushed by the crane and hoisting equipment.

c. No employee shall be permitted to work under any suspended loads. Exception: Where workers are engaged in the initial connection of steel or employees are unhooking the load.

TABLE 16-2

MINIMUM CLEARANCE FROM ENERGIZED OVERHEAD

ELECTRIC LINES

Voltage (nominal, kV, alternating current)	Minimum clearance distance
Up to 50	10 ft (3 m)
51 – 200	15 ft (4.6 m)
201 – 350	20 ft (6 m)
351 – 500	25 ft (7.6 m)
501 – 750	35 ft (10.7 m)
751 – 1000	45 ft (13.7 m)
Over 1,000	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

TABLE 16-3

MINIMUM CLEARANCE DISTANCES WHILE TRAVELING

WITH NO LOAD

Voltage (nominal, kV, alternating current)	While traveling - minimum clearance distance
Up to 0.75	4 ft (3 m)
.76 - 50	6 ft (4.6 m)
51 - 345	10 ft (6 m)
326 – 750	16 ft (7.6 m)
751 - 1000	20 ft (9.1 m)
Over 1,000	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

16.H CRITICAL LIFTS

16.H.01 When using cranes or hoists, the following are identified as critical lifts requiring detailed planning and additional or unusual safety precautions. Critical lifts are defined as:

a. Lifts involving hazardous materials (e.g., explosives, highly volatile substances);

b. Hoisting personnel with a crane or hoist;

c. Lifts made with more than one crane;

d. Lifts where the center of gravity could change;

e. Lifts the operator believes should be considered critical;

f. Lifts made when the load weight is 75% of the rated capacity of the crane load chart or more (not applicable to gantry, overhead or bridge cranes);

g. Lifts without the use of outriggers using rubber tire load charts;

h. Lifts using more than one hoist on the same crane or trolleys;

i. Lifts involving non-routine or technically difficult rigging arrangement (to include lifts involving Multiple Lift Rigging;

j. Lifts involving submerged loads.

- ***EXCEPTION:*** **lifts that were engineered to travel in guided slots throughout the lift and have fixed rigging and/or lifting beams, i.e., intake gates, roller gates, tailgates/logs);**

k. Lifts out of the operator's view.

- ***EXCEPTION:*** **if hand signals via a signal person in view of the operator or radio communications are available and in use, load does not exceed two tons AND is determined a routine lift by the lift supervisor;**

l. Load Tests;

m. When land cranes/derricks mounted on barges, pontoons or other means of flotation are required to travel while lifting the load. ***See paragraphs 16.L.03 and 16.L.04.***

16.H.02 Critical lift plans. Before making a critical lift, a critical lift plan shall be developed:

a. By a qualified person and shall include the crane operator, lift supervisor, and the rigger and signed by all involved personnel prior to the lift.

- ***NOTE: Any worker acting in the capacity of Rigging Lift Supervisor shall meet the requirements of this section;***

b. For a series of lifts on one project or job, as long as the cranes, personnel, type loads and configuration do not differ;

c. And documented with a copy provided to the GDA prior to the lift(s) being made;

d. And shall include, as a minimum:

(1) The specific make and model of the cranes, the line, boom, and swing speeds;

(2) The exact size and weight of the load to be lifted and all crane and rigging components that add to the weight. The manufacturer's maximum load limits for the entire range of the lift, as listed in the load charts, shall also be specified;

(3) The plan shall specify the lift geometry and procedures, including the crane position, height of the lift, the load radius, and the boom length and angle, for the entire range of the lift;

(4) Site drawing shall be included to identify placement/location(s) of crane, adjacent equipment and/or facilities, etc.;

(5) The plan shall designate the crane operator, lift supervisor and rigger and include their qualifications;

(6) The plan will include a rigging plan that shows the lift points and describes rigging procedures and hardware requirements;

(7) The plan will describe the ground conditions, outrigger or crawler track requirements, and, if necessary, the design of mats, necessary to achieve a level, stable foundation of sufficient bearing capacity for the lift;

(8) For floating crane or derricks, the plan shall describe the operating base (platform) condition and any potential maximum list / trim;

(9) The plan will list environmental conditions under which lift operations are to be stopped;

(10) The plan will specify coordination and communication requirements for the lift operation;

(11) For tandem or tailing crane lifts, identify the requirements for an equalizer beam if applicable.

16.I ENVIRONMENTAL CONSIDERATIONS

16.I.01 Projects shall have adequate means for monitoring local weather conditions, including a wind speed device located where it can measure maximum wind speed for the area.

16.I.02 Cranes shall not be operated when wind speeds at the site attain the maximum wind velocity based on the surface/load ratio recommendations of the manufacturer.

a. At winds greater than 20 mph (9 m/s), the operator, rigger, and lift supervisor shall cease all crane operations, evaluate conditions and determine if the lift shall proceed. This determination shall be based on wind calculations per manufacturer's recommendations.

b. The determination to proceed or not shall be documented in the crane operator's logbook.

16.I.03 When a local storm warning has been issued, the competent person shall determine whether it is necessary to implement manufacturer recommendations for securing the equipment.

16.I.04 Operations performed during weather conditions that produce icing of the crane and hoisting equipment structure or reduced visibility shall be performed at reduced functional speeds and with signaling means appropriate to the situation.

16.I.05 When conditions are such that lightning is observed all crane and hoisting equipment operations shall cease. A period of 30 minutes between subsequent observations shall be observed prior to resuming work.

16.I.06 For night operations, lighting adequate to illuminate the working areas while not interfering with the operator's vision shall be provided. **>** ***See Section 7.***

16.J LATTICE, HYDRAULIC, CRAWLER-, TRUCK-, WHEEL-, AND RINGER-MOUNTED CRANES

16.J.01 For required operator aids and indicating devices, see Section 16.E.03.

16.J.02 Boom assembly and disassembly. This operation shall be covered in the AHA and Competent Person shall be identified.

a. The manufacturer's boom assembly and disassembly procedures shall be reviewed by the team before starting the assembly or disassembly. The Competent Person shall be present during assembly/disassembly operations.

b. When removing pins or bolts from a boom, workers shall stay out from under the boom. Sections shall be blocked or otherwise secured to prevent them from falling.

16.J.03 Outriggers.

a. Anytime outriggers are required to be used, they shall be extended or deployed per the crane manufacturer's load/capacity chart specifications and set to remove the machine weight from the wheels at all settings, except for locomotive cranes.

b. When partially extended outriggers are used, the following requirements shall be met:

(1) Crane operation with partially extended outriggers shall only be undertaken if approved by the crane manufacturer;

(2) Outriggers shall be set at equal positions that correspond to the load/capacity charts supplied by the manufacturer for those positions. Only the load chart(s) corresponding to the outrigger positions shall be used for operation;

(3) When situations arise where outriggers must be set at unequal positions that correspond to the load/capacity charts corresponding with the individual quadrants of operation. The manufacturer or qualified Person shall be consulted to determine if the capacity reductions, special operating procedures, or limitations are required;

c. When outrigger floats are used, they shall be securely attached to the outriggers.

d. Blocking under outrigger floats shall meet the following requirements:

(1) Sufficient strength to prevent crushing, bending, or shear failure;

(2) Such thickness, width, and length as to completely support the float, transmit the load to the supporting surface, and prevent shifting, toppling, or excessive settlement under load; and

(3) Use of blocking only under the outer bearing surface of the extended outrigger beam floats.

16.J.04 Unless the manufacturer has specified an on-rubber rating, mobile cranes shall not pick or swing loads over the side of the crane unless the outriggers are down and <u>properly</u> extended.

16.J.05 Unless recommended against by the manufacturer, crane booms shall be lowered to ground level or secured against displacement by wind loads or other outside forces when not in use. If the manufacturer recommends against this practice, the manufacturer's recommended practice shall be followed.

16.J.06 When pick and carry operations occur (Rough Terrain Crane's), the boom must be centered over the front of the crane, the mechanical swing lock engaged, and the load restrained from swinging.

16.K PORTAL, TOWER, AND PILLAR CRANES

16.K.01 All load bearing foundations, supports, and rail tracks shall be constructed or installed as determined by a Registered Professional Engineer with knowledge in this area, in accordance with the crane manufacturer's recommendations.

16.K.02 Cranes shall be erected/dismantled in accordance with the manufacturer's recommendations, (or if manufacturer procedures are not available, in accordance with procedures developed by a Registered Professional Engineer with knowledge in this area).

a. When erected/dismantled, written instructions by the manufacturer and/or Registered Professional Engineer and a list of the weights of each component shall be kept at the site.

b. Erection and dismantling shall be performed under the supervision of a qualified person.

c. An AHA shall be developed and procedures established before the erection/dismantling work commences to insure site-specific needs are considered. The analysis will include:

(1) The location of the crane in relation to other tower cranes, adjacent buildings or towers, overhead power and communication lines, underground utilities;

(2) Foundation design and construction requirements; and

(3) When the tower is erected within a structure, clearances between the tower and the structure and bracing and wedging requirements.

d. Wind velocity at the site at the time of erection/dismantling shall be a consideration as a limiting factor that could require suspending the erection/dismantling operation and shall be as determined by the manufactured or if this data is not available, by a qualified person.

e. Before crane components are erected, they shall be visually inspected for damage. Dented, bent, torn, gouged or otherwise damaged members shall not be erected.

f. Initially and after each climb, the crane shall be plumbed and then held in the plumbed condition by wedges or other means. Cranes shall be plumbed to a tolerance of 1:500 (1 in:40 ft; 2.4 cm:12 m) unless the manufacturer specifies otherwise.

16.K.03 Pre-operation tests shall be performed when cranes are erected and after each climbing operation, before placing the crane in service. All functional motions, motion limiting devices and brakes shall be properly tested for operation in accordance with the manufacturer's recommended procedures and ANSI/ASME B30.3 or B30.4, as applicable:

a. Crane supports;

b. Brakes and clutches, limit and overload switches, and locking and safety devices; and

c. Load hoisting and lowering, boom hoisting and lowering, and swing motion mechanisms and procedures.

16.K.04 Climbing Procedures. Prior to and during, all climbing procedures (to include inside and top climbing), the employer shall:

a. Comply with all manufacturer prohibitions;

b. Have a registered professional engineer verify that the host structure is strong enough to sustain the forces imposed through the braces, brace anchorages and supporting floors;

c. Ensure that no part of the climbing procedure takes place when wind velocity at the crane superstructure exceeds the limit set by the manufacturer or a qualified person, or 20 mph (9 m/s) at the crane superstructure if no such limit has been set. The characteristics of the gusts should be considered for their effect on the climbing operation; and

d. The operator of a hammerhead tower crane shall be present during climbing or telescoping operations.

16.K.05 Safety devices and operational aids. Operations shall not begin unless the safety devices and operational aids are in place and in proper working order. In addition to those listed in 16.E.03, the following shall be provided:

a. Rail clamps, if used, shall have slack between the point of attachment to the rail and the end fastened to the crane. Rail clamps shall not be used as a means of restraining tipping of a crane display magnitude of load on the hook;

b. Hydraulic system pressure limiting device;

c. The following brakes, which shall automatically set in the event of pressure loss or power failure, are required: hoist brake on all hoists, swing brake, trolley brake, rail travel brake;

d. Deadman control or forced neutral return control (hand) levers;

e. Emergency stop switch at the operator's station;

f. Trolley travel limiting device prevents trolley from running into the trolley end stops;

g. Ambient wind velocity device. This device shall be mounted at or near the top of the crane. A velocity readout shall be provided at the operator's station in the cab, and a visible or audible alarm shall be triggered in the cab and at remote control stations when a preset wind velocity has been exceeded;

h. Hoist line pull limiting device (limits lifted load).

16.K.06 Multiple tower crane jobsites. On jobsites where more than one fixed jib (hammerhead) tower crane is installed, the cranes shall be located such that no crane may come in contact with the structure of another crane. Cranes are permitted to pass over one another.

16.K.07 Weathervaning. Tower cranes required to weathervane when out-of-service shall be installed with clearance for boom (jib) and superstructure to swing through a full 360 degree arc without striking any fixed object or other weathervaning crane. The boom shall be taken in the attitude dictated by its wind area balance. Non-weathervaning boom

(jibs) shall be taken in the least favorable attitude. Traveling cranes shall also resist design wind level induced sliding.

16.L FLOATING CRANES/DERRICKS, CRANE BARGES, AND AUXILIARY SHIPBOARD MOUNTED CRANES

16.L.01 The requirements in this section are supplemental requirements for floating cranes/derricks, land cranes/derricks on barges, pontoons, vessels or other means of flotation and auxiliary shipboard mounted cranes, unless otherwise specified.

16.L.02 Design & Construction Standards. The lifting equipment on floating cranes, crane barges and on ships (shipboard cranes) shall be designed and constructed in accordance with one of the following standards:

- ANSI/ASME B30.8;
- American Bureau of Shipping (ABS) Guide for Certification of Cranes, or
- American Petroleum Institute (API) Specification 2C.

16.L.03 Stability During Lift Operation. During lift operations, the stability of the floating crane, crane/derrick or vessel and shipboard crane shall meet the requirements for “lifting” as set forth in 46 CFR 173.005 through 46 CFR 173.025.

16.L.04 Floating Service Naval Architectural Analysis.

a. Naval Architectural Analysis Procedures. A Naval Architectural Analysis shall be performed to determine the allowable loads and radii for floating cranes/derricks, and shipboard cranes.

(1) The load rating developed in the Naval Architectural Analysis shall match the maximum working loads at various radii (as determined by the manufacturer or qualified person) to the trim and heel that the floating platform will experience during lift operations.

(2) The analysis shall also consider the structural competence of the crane, rope strength, hoist capacity, structural attachment to the floating platform, and the stability, heel and trim and freeboard of the floating platform.

b. Deck Loads. When deck loads are to be carried while lifting, the Naval Architectural Analysis shall incorporate the deck loading to develop modified lift ratings for use with the deck load aboard.

c. Wind Speed. The Naval Architectural Analysis shall take into consideration a minimum wind speed of 40 mph (18 m/s).

d. Naval Architectural Analysis Results. The Naval Architectural Analysis shall specifically identify: Design Standard, load, height and radius; machine trim; machine list, and anticipated dynamic/environmental loadings for the operation of the floating crane/derrick or shipboard crane.

e. Floating Service Load Chart. The Naval Architectural Analysis shall be used to develop the Floating Service Load Chart.

16.L.05 Floating Service Load Chart.

a. The Floating Service Load Chart shall be posted in the cab or at the operator's station (if no cab). All other procedures applicable to the operation of the equipment (instructions and operators manual, recommended operating speeds, etc.) shall be readily available on board.

b. The Floating Service Load Chart shall, at a minimum, identify the following:

(1) Naval Architect Notes delineating:

(a) Draft limits (with deck cargo considered);

(b) Vessel motion limits;

(c) Vessel heel and trim limits;

(d) Crane Machine Trim and machine Heel limits;

(e) Vessel condition (e.g., dry bilges, watertight integrity, etc.).

(2) Crane manufacturer notes, or reference to them.

(3) Safe Working Load Chart with:

(a) Mode of operation;

(b) Environmental limits;

(c) Capacity (net or gross);

(d) Load, boom elevation, radius (with list/trim considered);

(e) Maximum Machine List and Machine Trim;

(f) Crane configuration, to include boom length, amount of counterweight, parts of wire, and block size.

16.L.06 Land cranes/derricks mounted on barges, pontoons or other means of flotation.

a. Naval Architectural Analysis. The Naval Architectural Analysis as identified in 16.L.04 shall be performed for land cranes/derricks mounted on barges or pontoons. A Floating Service Load Chart as required in 16.L.05 shall be developed. In addition, in order to ensure safe operation of land cranes/derricks afloat, the following parameters shall be evaluated in the Naval Architectural Analysis:

(1) Load Charts. The rated capacity of the equipment (load charts) applicable for use on land shall be reduced by the equipment manufacturer, or a qualified person who has expertise with respect to both land crane/derrick capacity and the stability of vessels/flotation devices;

(2) Specific Locations. Specified location(s) on the specific barge, pontoons, vessel or other means of flotation that will be used, under the expected environmental conditions will be evaluated;

(3) Allowable Machine List and Machine Trim. Analysis shall ensure that the maximum allowable list and trim for the land crane/derrick shall not exceed the amount specified by the crane/derrick manufacturer or if not specified, the amount specified by the qualified person;

(4) Deck Surfaces. Analysis shall ensure that all deck surfaces of the barge, pontoon or flotation device shall be above the water;

(5) Bottom Surfaces. Analysis shall ensure that the entire bottom area of the barge, pontoon or flotation device shall be submerged for all lifts.

b. Physical Attachment.

(1) Derricks shall be secured to the deck to transmit the loading to the barge or pontoon.

(2) Cranes shall be blocked or secured to prevent shifting.

(3) The crane shall be allowed to travel on the barge for repositioning only. If traveling is required while lifting the load, this lift shall be deemed a critical lift and a critical lift plan is required. It must include a Naval Architectural Analysis to determine these parameters. A marine engineer or registered professional engineer familiar with floating crane design shall perform this analysis. In addition, the manufacturer's recommendations shall be followed.

16.L.07 Mobile Auxiliary Cranes Used on Barges or Pontoons.

a. Heel and Trim Indication. Mobile auxiliary cranes used on the deck of a floating crane or derrick will be subjected to the heel and trim movements generated by the floating crane main crane, or by movement of the mobile auxiliary crane itself. Mobile auxiliary cranes shall be provided with machine list and machine trim indicator devices to allow the operator to ensure the crane is operated within it trim and heel limits for all conditions of barge heel and trim.

b. Mobile Auxiliary Crane Load Chart. Mobile Auxiliary Cranes used afloat shall be provided with load charts that identify maximum allowable machine list and machine trim. The load chart shall be used in concert with the list and trim indicator devices.

c. Physical Attachment. For mobile auxiliary cranes used on deck of a floating crane/derrick, the requirement for physical attachment does not apply when the following can demonstrate the following requirements have been met:

(1) A marine engineer or registered professional engineer familiar with floating crane/derrick design develops and signs a written plan for the use of the mobile auxiliary crane.

(2) The plan shall be designed so that the requirements for safe location of equipment will be met despite the position, travel, operation, and lack of physical attachment of the mobile auxiliary crane.

(3) The plan shall specify the areas of the deck where the mobile auxiliary crane is permitted to be positioned, travel and operate and the parameters or limitations of such movements and operation.

(4) The deck shall be marked to identify the permitted areas for positioning, travel and operation.

(5) The plan shall specify the dynamic and environmental conditions that must be present for the use of the plan. If the dynamic and environmental conditions are exceeded, the mobile auxiliary crane shall be physically attached or corralled.

16.L.08 A-Frame Non-Slewing Anchor Handling Barge/Vessel.

a. A-Frame Non-Slewing anchor handling barge/vessels may be used for anchor handling, low lifting of loads such as anchor buoys/weights, dredge pipe, submerged pipeline, pontoons, and other loads provided they do not exceed the load rating of the anchor barge/vessel. If used for any other lifting application, the work platform will be considered a floating derrick and all other requirements of Section 16 apply. Anchor barge/vessels shall also comply with the following:

(1) All deck surfaces of the pontoon or barge shall be above the water;

(2) Means for limiting the applied load, such as mechanical means or marking the draft of the barge corresponding to the rated load, shall be provided. Calculations shall be available and the barge shall be tested to verify rated load;

(3) A ratchet and pawl shall be provided for releasing the load from the hoisting machinery brake;

(4) An operating manual/procedure shall be available for use by the operator. The operator shall be trained in the anchor handling barge systems operation.

b. If additional external load is superimposed above that which can be hoisted with the onboard hoisting machinery, then a chain stopper shall be used to remove the external load from the A-frame and hoist machinery.

16.L.09 Employer Made Lift Equipment Used on Barges or Pontoons. If lift equipment is employer-made, it shall not be used unless the employer has documents demonstrating that the load charts and applicable parameters for use meet the requirements of paragraph 16.L.02. Such documents shall be signed

by a marine engineer or a registered professional engineer who is a qualified person with respect to the design of this type of equipment (including the means of flotation).

16.L.10 Near-Maximum Loads. When loads approach the maximum rating of the crane or derrick, the person responsible for the job shall ascertain that the weight of the load has been determined within +/- 10% before it is lifted.

16.L.11 Safety devices and Operational Aids. In addition to those required by section 16.E.03, the following are required:

a. Pontoon, barge, vessel or flotation device list and trim device: Shall be located in the cab or at the operator's station (if there is no cab) as a means for the operator to visually determine the list and trim;

b. Wind speed and direction indicator: within clear view of the operator's station;

c. Anti two-block device.

16.L.12 Walking Surfaces. Principal walking surfaces shall be of a skid-resistant type.

16.L.13 Inspections. In addition to inspection of the crane/derrick per 16.D, inspection of the barge, pontoons, vessel or other means of flotation used to support a land crane/derrick by a competent person is required.

a. Each shift: the means used to secure/attach the equipment to the vessel/flotation device shall be inspected for proper condition, to include wear, corrosion, loose or missing fasteners, defective welds and (where applicable) insufficient tension.

b. Monthly: In addition to 16.L.08.a, the vessel/means of flotation used shall be inspected for the following:

(1) Taking on water;

(2) Deckload for proper securing;

(3) Chain lockers, storage, fuel compartments and battening of hatches for serviceability as a water-tight appliance;

(4) Firefighting and lifesaving equipment in place and functional.

c. If any deficiency is identified, an immediate determination shall be made by a qualified person as to whether the deficiency constitutes a hazard. If so, the vessel/flotation device shall be removed from service until it has been corrected.

16.L.14 Operations.

a. Operators shall monitor the wire lead from the boom tip carefully to ensure that limits on off-lead and side-lead identified in the load chart are not exceeded.

b. Operators shall monitor environmental criteria for compliance with the criteria set forth in the load chart.

c. Operators should be aware that safety devices such as LLD(s) and LMI(s) do not offer protection against loads generated by relative motions between a floating crane and a fixed object to be lifted. The AHA shall address the potential for gross overload and failure mode conditions.

d. Whenever practical, crane use during buoy tending shall be limited to lifting the freely suspended buoy clear of the water onto the vessel.

e. Bilges shall be kept as dry as possible to eliminate the adverse effect of free surface (sloshing liquid).

16.L.15 Lift Planning. All lifts must be planned to avoid procedures that could result in configurations where the operator cannot maintain safe control of the lift.

a. Lifts shall reflect floating operational parameters such as: anticipated values for wire leads, unknown load for extractions, and upper limits on crane force.

b. When deck loads are to be carried while lifting, the situation shall be analyzed for modified ratings.

c. When mounted on barges or pontoons, the rated loads and radii of land cranes shall be modified as recommended by the manufacturer or qualified person. The modification shall be evaluated by the qualified person specific to the flotation device/platform being used.

d. Load charts shall be posted in the cab or at the operator's station (if no cab). All other procedures applicable to the operation of the equipment (instructions and operators manual, recommended operating speeds, etc.) shall be readily available on board.

e. Load charts shall, at a minimum, identify the following:

(1) Naval Architect Notes:

(a) Draft limits (with deck cargo considered);

(b) Vessel motion limits;

(c) Vessel and crane list/trim limits, and

(d) Vessel condition (e.g., dry bilges, watertight integrity, etc.).

(2) Crane manufacturer Notes, or reference to them;

(3) Safe Working Load Chart with:

(a) Mode of operation;

(b) Environmental limits;

(c) Capacity (net or gross);

(d) Load, boom elevation, radius (with list/trim considered), and

(e) Crane configuration, to include boom length, amount of counterweight, parts of wire, and block size.

16.M OVERHEAD AND GANTRY CRANES

16.M.01 The requirements in this section are supplemental requirements for overhead and gantry cranes whether permanently installed in a facility or not and includes overhead/bridge cranes, semi gantry, cantilever gantry, wall cranes, storage bridge cranes, and others having the same fundamental characteristics whether it travels on tracks, wheels or other means (unless otherwise specified).

16.M.02 All load bearing foundations, anchorages, runways, and rail tracks shall be constructed or installed in accordance with the crane manufacturer's recommendations and ANSI/ASME B30.2 or B30.17, as applicable.

16.M.03 The rated load of the crane shall be plainly marked on each side of the crane.

a. If the crane has more than one hoisting unit, each hoist shall have its rated load marked on it or its load block.

b. Markings on the bridge, trolley, and load block shall be legible from the ground or floor.

16.M.04 Clearance shall be maintained between the crane, any structure or object, and any parallel running cranes and cranes operating at different elevations.

16.M.05 Contacts with runway stops or other cranes shall be made with extreme caution. The operator shall do so with particular care for the safety of persons on or below the crane, and only after making certain that any persons on the other cranes are aware of what is being done.

16.M.06 Operators of outdoor cranes shall secure them when leaving.

16.M.07 When the wind-indicating alarm of a cab-operated outdoor crane sounds, crane operations shall be discontinued and the crane shall be prepared and stored for excessive wind conditions.

16.N MONORAILS AND UNDERHUNG CRANES

16.N.01 Crane runways, monorail tracks, track supports, and track control devices shall be constructed or installed in accordance with the crane manufacturer's recommendations and ANSI/ASME B30.11.

16.N.02 The rated load of the crane shall be plainly marked on each side of the crane.

a. If the crane has more than one hoisting unit, each hoist shall have its rated load marked on it or its load block.

b. Markings on the bridge, trolley, and load block shall be legible from the ground or floor.

16.O DERRICKS

16.O.01 For permanent fixed locations, the following load anchoring data shall be provided to the GDA. For non-permanent installations, this data shall be determined by a qualified person.

a. Guy derricks.

(1) Maximum horizontal and vertical forces when handling rated loads with the particular guy slope and spacing stipulated for the application, and

(2) Maximum horizontal and vertical forces at the guy when handling rated loads with the particular guy slope and spacing stipulated for the application.

b. Stiffleg derricks.

(1) Maximum horizontal and vertical forces at the mast base when handling rated loads with the particular stiffleg slope and spacing stipulated for the application, and

(2) Maximum horizontal and vertical forces at the stifflegs when handling rated loads with the particular stiffleg arrangement stipulated for the application.

16.O.02 Derrick booms, load hoists, and swinger mechanisms shall be suitable for the derrick work intended and shall be anchored to prevent displacement from imposed loads.

16.O.03 When rotating a derrick, sudden starts and stops shall be avoided and rotational speed shall be such that the load does not swing out beyond the radius at which it can be controlled. A tagline shall be used.

16.O.04 Boom and hoisting rope systems shall not be twisted.

16.O.05 Ropes shall not be handled on a winch head without the knowledge of the operator. When a winch head is being used, the operator shall be within reach of the power unit controls.

16.O.06 When securing the boom, dogs or other positive holding mechanisms on the hoist shall be engaged.

16.O.07 When not in use the derrick boom shall be either:

a. Laid down;

b. Secured to a stationary member as nearly under the head as possible by attachment of a sling to the load block;

c. Lifted to a vertical position and secured to the mast (for guy derricks); or

d. Secured against a stiffleg (for stiffleg derricks).

16.P HANDLING LOADS SUSPENDED FROM ROTORCRAFT

16.P.01 Helicopter cranes shall comply with regulations of the Federal Aviation Administration (FAA).

16.P.02 Before each day's operation, a briefing shall be conducted to set forth the plan of operation for the pilot and ground personnel.

16.P.03 Loads shall be properly slung.

a. Tag lines shall be of a length that will not permit their being drawn up into rotors.

b. Pressed sleeve, swedged eyes, or equivalent means shall be used for all freely suspended loads to prevent hand splices from spinning open or wire clamps from loosening.

16.P.04 All electrically operated cargo hooks shall have the electrical activating device so designed and installed as to prevent inadvertent operation.

a. In addition, these cargo hooks shall be equipped with an emergency mechanical control for releasing the load.

b. The hooks shall be tested prior to each day's operation to determine that the release functions properly, both electrically and mechanically.

16.P.05 PPE for employees receiving the load shall consist of eye protection and hard hats secured by chinstraps.

16.P.06 Loose-fitting clothing likely to flap in the downwash, and be snagged on the hoist line, shall not be worn.

16.P.07 Every practical precaution shall be taken to provide for the protection of the employees from flying objects in the rotor downwash. All loose gear within 100 ft (30.4 m) of the place of lifting or depositing the load, and all other areas susceptible to rotor downwash, shall be secured or removed.

16.P.08 The helicopter pilot shall be responsible for the size, weight, and manner in which loads are connected to the helicopter. If, for any reason, the helicopter pilot believes the lift cannot be made safely, the lift shall not be made.

16.P.09 When employees are required to work under hovering craft, safe access shall be provided for employees to reach the hoist line hook and engage or disengage cargo slings. Employees shall not work under hovering craft except to hook, unhook, or position loads.

16.P.10 Static charge on the suspended load shall be dissipated with a grounding device before ground personnel touch the suspended load, or protective rubber gloves shall be worn by all ground personnel touching the suspended load.

16.P.11 The weight of an external load shall not exceed the rated capacity.

16.P.12 Hoist wires or other gear, except for pulling lines or conductors that are allowed to "pay out" from a container or roll off a reel, shall not be attached to any fixed ground structure or be allowed to foul on any fixed structures.

16.P.13 When visibility is reduced by dust or other conditions, ground personnel shall exercise special caution to keep clear of main and stabilizing rotors. Precautions shall also be taken to eliminate reduced visibility.

16.P.14 No unauthorized person shall be allowed to approach within 50 ft (15.2 m) of the helicopter when the rotor blades are turning.

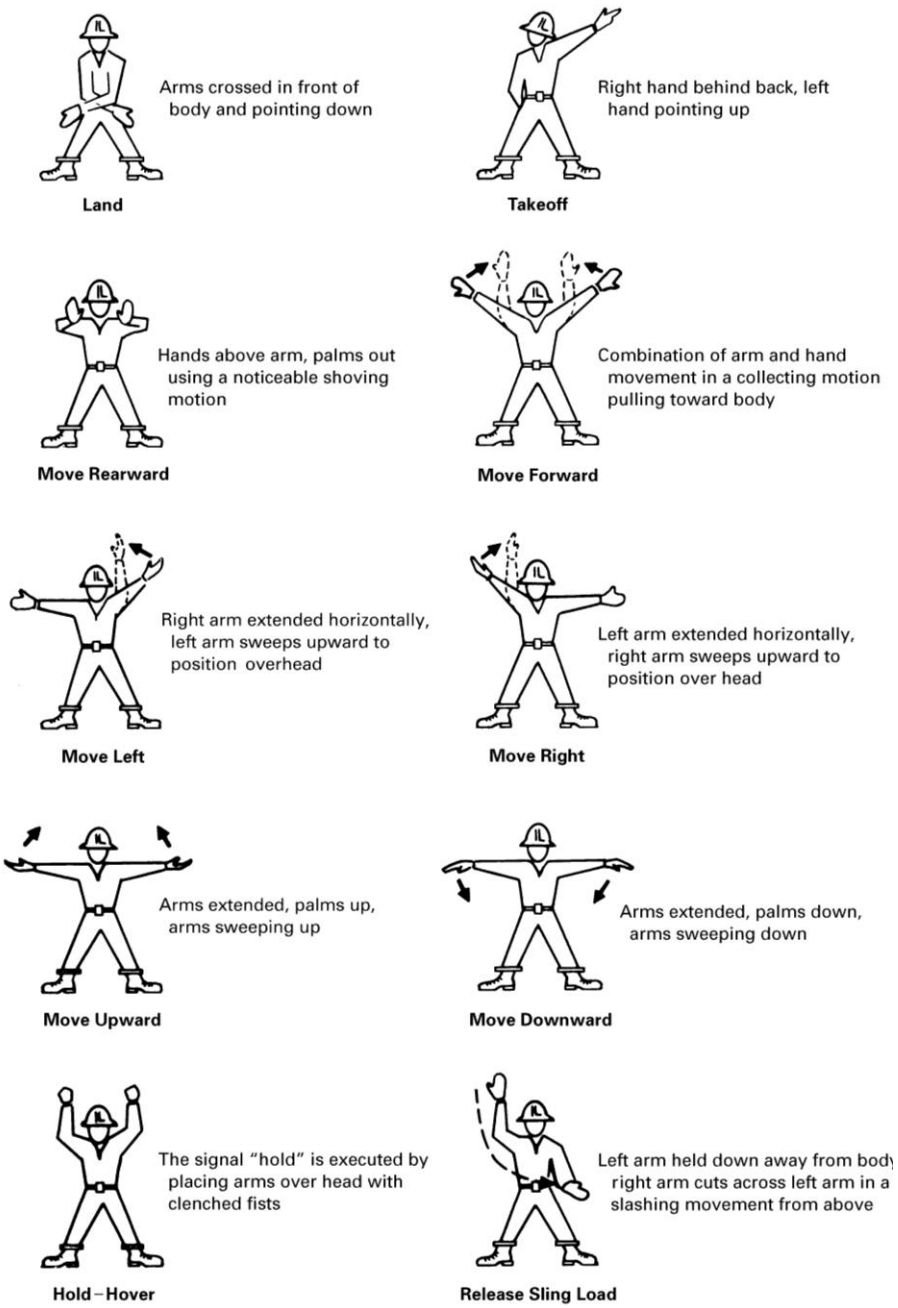
16.P.15 Whenever approaching or leaving a helicopter with blades rotating, all employees shall remain in full view of the pilot and keep in a crouched position. Employees shall avoid the area from the cockpit or cabin rearward unless authorized by the helicopter pilot to work there.

16.P.16 There shall be constant reliable communication between the pilot and a designated employee of the ground crew who acts as a signal person during loading and unloading. This signal person shall be distinctly recognizable from other ground personnel. ***> See Figure 16-2***

16.P.17 Good housekeeping shall be maintained in all helicopter loading and unloading areas.

FIGURE 16-2

HELICOPTER HAND SIGNALS



16.Q MATERIAL HOISTS

16.Q.01 Material hoists shall be designed to raise and lower materials during construction, alteration, or demolition. It is not applicable to the temporary use of permanently installed elevators as material hoists. They shall be constructed and installed in accordance with the requirements of ANSI A10.5.

16.Q.02 Material hoist towers, masts, guy or braces, counterweights, drive machinery supports, sheave supports, platforms, supporting structures, and accessories shall be designed by a licensed engineer.

16.Q.03 Hoist towers shall be erected and dismantled only under the direct supervision of a qualified individual.

16.Q.04 A copy of the hoist operating manual shall be available at all times it is operated.

16.Q.05 Material hoists and hoist tower systems shall be inspected in accordance with the manufacturer's recommendations.

a. Prior to initial use and each time after the tower is extended, all parts of the tower or mast, cage, bucket, boom, platform, hoisting machine, guy, and other equipment shall be inspected by a qualified person to ensure compliance with the manufacturer's inspection guidelines and ANSI A10.5.

b. Prior to initial use on a USACE project, and monthly thereafter, a periodic inspection shall be conducted by a qualified person. Periodic inspections shall cover those items specified by the manufacturer.

c. A GDA shall be notified at least 24 hours prior to any of the above inspections and may wish to accompany the contractor's inspector.

d. Pre-operational inspections (start-up procedures) shall be conducted by the operator prior to every operation (shift) of the hoist.

16.Q.06 Before a hoist is placed in service and every 4 months thereafter, a car-arresting-device test shall be performed.

a. For rope-supported cars, the test shall be conducted in the following manner:

(1) Pull a loop in the lifting rope and attach the test rope to each side of the loop above the bucket or platform;

(2) Raise the platform or bucket to allow the load to be supported by the test rope; and

(3) Cut the test rope to allow the load to fall and activate the car-arresting device.

b. For car suspension other than rope supported, the test shall be conducted by creating an over speed condition of the car.

c. Structural components shall be inspected for damage after the test and before the hoist is placed in operation again.

16.Q.07 Maintenance and repairs.

a. Replacement parts for load bearing or critical components shall be either obtained from or certified by the equipment manufacturer.

b. Maintenance and repairs shall be conducted in accordance with the manufacturer's procedures.

16.Q.08 Landings and runways.

a. Landing platforms and runways that connect the hoist way or tower to a structure shall be designed and constructed to sustain the maximum intended load without failure.

b. Floors or platforms that may become slippery shall have slip-resistant surfaces.

c. When workers may be exposed to falling objects, overhead protection, composed of 2-in (5-cm) planking or the equivalent, shall be provided.

d. A barricade shall be provided at the open ends of each landing. The barricade shall extend a minimum distance of 6 ft (1.8 m) laterally

along the outer edge of the landing from each side of the hoist way, shall extend from the floor a distance of at least 3 ft (0.9 m), and shall be of #19 US gauge wire or the equivalent, with openings not exceeding 0.5 in (1.2 cm).

e. All hoist way entrances shall be protected by substantial gates or bars that shall guard the full width of the landing entrance. Gates shall be not less than 66 in (167.6 cm) in height, with a maximum under clearance of 2 in (5 cm), and shall be located not more than 4 in (10 cm) from the hoist way line. Gates of grille, lattice, or other open work shall have openings of not more than 2 in (5 cm).

f. Material shall not be stored on landing platforms or runways.

16.Q.09 Whenever a slack line condition occurs, the proper seating of the rope in the sheaves and on the drum shall be checked prior to further operations.

16.Q.10 Riding on material hoists or other hoisting equipment not meant for personnel handling is prohibited.

16.Q.11 While hoisting equipment is in operation, the operator shall not perform any other work and shall not leave his/her position at the controls until the load has been safely landed or returned to ground level.

16.Q.12 Not more than one cage or bucket shall be operated at the same time by any one hoisting machine or operator.

16.Q.13 Operating rules shall be established and posted at the operator's station of the hoist. Such rules shall include signal system and allowable line speed for various loads. Rules and notices shall be posted on the car frame or crosshead in a conspicuous location, including the statement **"NO RIDERS ALLOWED."**

16.Q.14 Air-powered hoists shall be connected to an air supply of sufficient capacity and pressure to safely operate the hoist. Pneumatic hoses shall be secured by some positive means to prevent accidental disconnection.

16.R PILE DRIVERS

16.R.01 Pile drivers shall be equipped with a positive and negative restraint device to prevent accidental hammer disengagement (i.e., preventing the hammer from falling or uncontrolled rising out of the lead, as well as preventing contact with head block or sheaves).

16.R.02 Prior to initiating pile driving or extraction operations, the contractor shall develop a site-specific safety plan. The plan shall identify specific steps for the intended operations, list of hazards, and procedures to minimize or eliminate those hazards. Plans shall include, as a minimum:

(a) location of utilities both above and below grade;

(b) designated areas for equipment operations and material storage;

(c) assembly and disassembly sequences for pile driving equipment;

(d) operation of pile driving equipment and handling of pile materials;

(e) a geotechnical report identifying subsurface and surface ground conditions;

(f) a documented daily inspection requirement to include the hammer, cushion blocks, rigging, fuel lines, pressurized hoses, clamps, welds, hardware, and all other pile driving associated equipment;

(g) establishment of a controlled access zone to prevent access by persons not directly involved in the operation.

16.R.03 With the exception of the pile driver equipment operator (crane/track hoe/forklift), personnel shall not stand under the kicker/spotter or directly under, in front of, or closer than 12 ft (4 m), or greater if manufacturer specifies, of the pile hammer or pile when the pile is being driven. The crane/track hoe/forklift operator station shall be protected with falling object protective structures. ***> See 18.B.12***

16.R.04 Other cranes used in duty cycle operations, to include pile driving and extracting operations (except telescopic boom cranes), are exempt from the requirements for A2B devices. ***> See 16.E.03.d (3).***

16.R.05 Guy, outriggers, thrust outs, counter-balances, or rail clamps shall be provided to maintain stability of pile-driver rigs.

16.R.06 Pile-driver leads.

a. Swinging (hanging) leads.

(1) Swinging (hanging) leads shall have fixed ladders.

(2) Employees shall be prohibited from remaining on leads or ladders while pile is being driven.

b. Fixed leads.

(1) Fixed pile-driver leads shall be provided with decked landings having guard rails, intermediate rails, and toe boards. Fixed ladders or stairs shall be provided for access to landings and head blocks.

(2) Fixed leads shall be provided with rings or attachment points so that workers exposed to falls of 6 ft (1.8 m) or greater may attach their safety harnesses to the leads.

c. Landings or leads shall not be used for storage of any kind.

d. Pile-driver leads shall have stop blocks to prevent the hammer from being raised against the head block.

e. A blocking device, capable of supporting the weight of the hammer, shall be provided for placement in the leads under the hammer at all times while employees are working under the hammer.

f. Leads shall be free of projections or snags to minimize line damage and personnel safety hazards.

16.R.07 Dogs, on pile-driver hoist drums, that automatically disengage when the load is relieved or the drum is rotated shall be prohibited.

16.R.08 Guards shall be provided across the top of the head block to prevent wire from jumping out of the sheaves.

16.R.09 All hose connections to pile-driver hammers, pile ejectors, or jet

pipes shall be securely attached with an adequate length of at least ¼ in (0.6-cm) alloy steel chain, having 3,250 lb (1,500 kg) working load limit, or equal strength wire, to prevent whipping if the joint is broken.

16.R.10 Steam/hydraulic line controls shall consist of two shutoff valves, one of which shall be a quick-acting lever type within easy reach of the hammer operator.

16.R.11 Floating pile drivers.

a. The width of hulls of floating pile drivers shall not be less than 45% of the height of the lead above the water.

b. The operating deck of floating pile drivers shall be so guarded as to prevent piles that are being hoisted into driving position from swinging in over the deck.

16.R.12 Hoisting and moving pile.

a. All employees shall be kept clear when piling is being hoisted into the leads.

b. Hoisting of steel piling shall be done by use of a closed shackle or other positive attachment that will prevent accidental disengagement.

c. Taglines shall be used for controlling unguided piles and free hanging (flying) hammers.

d. Hammers shall be lowered to the bottom of the leads while the pile driver is being moved.

16.R.13 When driving jacked piles, all access pits shall be provided with ladders and bulk headed curbs to prevent material from falling into the pit.

16.R.14 When it is necessary to cut off the tops of driven piles, pile-driving operations shall be suspended except where the cutting operations are located at least twice the length of the longest pile from the driver.

16.R.15 Pile extraction.

a. If piling cannot be pulled without exceeding the load rating of equipment, a pile extractor shall be used.

b. When pulling piling, the crane shall be equipped with LID devices (unless the load can be calculated and is within the load rating chart of the crane) and the booms shall not be raised more than 60° above the horizontal. (This requirement does not apply to vibrating-type pulling devices.)

c. Piling shall not be pulled by tipping the crane, releasing the load brake momentarily, and catching the load before the crane has settled.

16.S HYDRAULIC EXCAVATORS, WHEEL/TRACK/BACKHOE LOADERS USED TO TRANSPORT OR HOIST LOADS WITH RIGGING

16.S.01 Hydraulic excavating equipment shall not be used to hoist personnel. The riding of personnel on loads, hooks, hammers, buckets or any other hydraulic excavating equipment attachment is prohibited.

16.S.02 Hydraulic excavating equipment may only be used to transport or hoist loads if allowed by the equipment manufacturer***.*** If these procedures are unavailable, you are prohibited from performing this function. ***> See Figure 16-3.***

16.S.03 When hydraulic excavating equipment is to be used to transport or hoist loads utilizing hooks, eyes, slings, chains, or other rigging the following requirements shall apply:

a. Operations involving the use of hydraulic excavating equipment and rigging to transport or hoist loads require different operator skills and considerations than the standard excavating operations routinely performed with hydraulic excavating equipment. An AHA specific to the transporting or hoisting operation shall be prepared. The AHA shall include, but not be limited to:

(1) Written proof of qualifications of equipment operators, riggers, and others involved in the transporting and hoisting operations;

(2) Operational testing shall be performed as described in 16.S.03.b;

(3) Proper operating procedures in accordance with the equipment manufacturer's operating manual;

(4) Proper use and on site availability of manufacturer's load rating capacities or charts;

(5) Proper use of rigging, including positive latching devices to secure the load and rigging;

(6) Inspection of rigging;

(7) Use of tag lines to control the load;

(8) Adequate communications;

(9) Establishment of a sufficient swing radius (equipment, rigging and load); and

(10) Stability of surfaces beneath the hydraulic excavating equipment.

b. An operational test with the selected hydraulic excavating equipment will be performed in the presence of the GDA.

(1) The operational test shall consist of a demonstration that the test load and selected rigging can be safely lifted, maneuvered, controlled, stopped, and landed.

(2) The operational test shall be representative of the complete cycle of the proposed transporting or hoisting operation, including configuration, orientation and positioning of the excavating equipment and the use of identical rigging.

(3) The test load shall be equivalent to the maximum anticipated load, but shall not exceed 100% of the manufacturer's load rating capacity for the excavating equipment as configured. Written documentation of the performance of the operational test outlining test procedures and results shall be maintained at the on-site project office.

c. All rigging and rigging operations shall comply with the requirements of Section 15. Hooks, eyes, slings, chains or other rigging

shall not be attached to or hung from the teeth of a bucket during the transporting or hoisting of a load by hydraulic excavating equipment.

d. After the completion and acceptance of an operational test described in 16.S.03.b, if repairs, major maintenance or reconfiguration are required to be performed on the hydraulic excavating equipment or attachments, another operational test as described in 16.S.03.b shall be performed to demonstrate that the completed repairs are satisfactory and that the test load and selected rigging can be safely lifted, maneuvered, controlled, stopped, and landed.

16.S.04 Loads shall be lifted the minimum height necessary to clear the ground or other obstacles and carried as low as possible when the equipment is traveling.

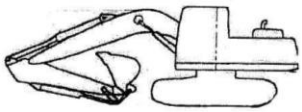
16.S.05 Loads shall not be lifted over personnel.

16.S.06 Adequate clearances shall be maintained from electrical sources.

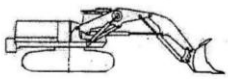
FIGURE 16-3

HYDRAULIC EXCAVATING EQUIPMENT USED TO TRANSPORT OR HOIST LOADS

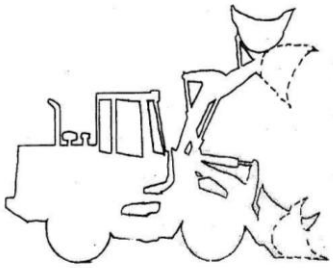
EXCAVATORS



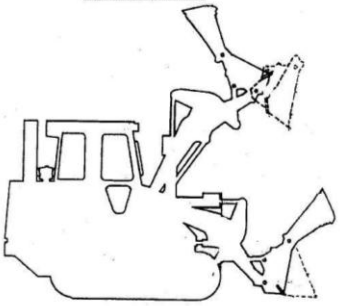
EXCAVATORS – FRONT SHOVELS



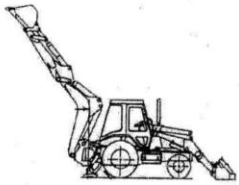
WHEEL LOADERS



TRACK LOADERS



BACKHOE LOADERS



16.T CRANE-SUPPORTED PERSONNEL (WORK) PLATFORMS

16.T.01 Crane supported personnel platforms are only allowed to be used if the crane manufacturer allows personnel lifting to occur on that equipment. In addition, provisions must be made for emergency lowering of the personnel platform in the event of a (crane) power failure.

16.T.02 If a crane supported work platform is determined to be the only safe method of access, the operation shall be deemed a critical lift (per Section 16.H) and meet the following requirements:

a. The person responsible for the lift shall perform an AHA and attest to the need for the operation in writing.

b. The responsible person shall sign the AHA and submit it to the GDA for acceptance.

c. Personnel shall not be hoisted until the GDA has accepted the AHA.

d. Crane supported work platforms may be used for routine access of employees to underground construction via a shaft.

16.T.03. The work platform and suspension system shall be designed and certified by a Registered Professional Engineer with knowledge in this area.

a. The work platform (excluding fall protection systems) shall be capable of supporting, without failure, its own weight and at least five times the maximum intended load. Criteria for fall protection systems are contained in Sections 21 and 16.T.10.

b. The suspension system shall be designed to minimize tipping of the platform due to movement of the employees on the work platform.

c. The system used to connect the work platform to the equipment shall allow the platform to remain within 10 degrees of level, regardless of boom angle.

d. All welding of the work platform and its components shall be

performed by a Certified Welder familiar with the weld grades, types, and material specified in the platform design.

16.T.04 Crane supported work platforms shall meet the following requirements:

a. The scaffold shall be of metal or metal frame construction with a standard guardrail system and shall be enclosed at least from the toeboard to mid-rail with either solid construction material or expanded metal having openings no greater than ½ in (1.2 cm).

b. A grab rail shall be installed inside the entire perimeter of the personnel platform.

c. Access gates, if installed, shall not swing outward and shall be equipped with a device to prevent accidental opening.

d. Headroom shall be provided which allows employees to stand upright in the platform.

e. In addition to the use of hardhats, employees shall be protected by overhead protection on the personnel platform when the employee(s) are exposed to falling objects.

f. The platform shall be conspicuously posted with a plate or other permanent marking that indicates the weight of the platform and its rated load capacity or maximum intended load.

16.T.05 Rigging.

a. When a wire rope bridle is used to connect the work platform to the load line, each bridle leg shall be connected to a master link or shackle in such a manner to ensure that the load is evenly distributed among the bridle legs.

b. The hook connection to the platform rigging shall be of a type that can be closed and locked to eliminate the hook throat opening and shall be closed and locked when attached. Alternately, an alloy anchor type shackle with a bolt, nut, and retaining pin, in place OR of the screw type, with the screw pin secured from accidental removal may be used.

c. Wire rope and rigging hardware and hooks shall be capable of supporting, without failure, at least five times the maximum intended load.

d. Where rotation-resistant rope is used the slings shall be capable of supporting without failure at least ten times the maximum intended load.

e. Rope sling suspension systems with mechanically spliced flemish eyes, if used, shall be designed with thimbles in all eyes.

f. Bridles and associated rigging for attaching the platform to the hoist line shall be used only for the platform and the employees, their tools and the materials necessary to do the work and shall not be used for any other purpose when not hoisting personnel.

16.T.06 Work Practices.

a. Before employees enter or exit a hoisted personnel platform that is not landed, the platform shall be secured to the structure, unless securing to the structure creates an unsafe condition.

b. The rated load capacity of the platform shall not be exceeded.

c. The number of employees occupying the work platform shall not exceed the number required for the work to be performed.

d. Work platforms shall be used only for employees, their tools and the materials necessary to do their work. Work platforms shall not be used to hoist only materials or tools when not hoisting personnel.

e. Materials and tools for use during a personnel lift shall be secured to prevent displacement. They shall be evenly distributed within the confines of the platform while it is suspended.

f. No lifts shall be made on another of the crane's or derrick's load lines while personnel are suspended on a platform.

g. Employees (except a designated signal personal) shall keep all parts of the body inside the platform during raising, lowering, and positioning.

h. A competent person shall observe the operations while personnel are working from the crane supported work platform.

i. Environmental conditions.

(1) Wind. When wind speed (sustained or gusts) exceeds 20 mph (9 m/s) at the work platform, a qualified person shall determine if, in light of the wind conditions, if it is safe to lift personnel. If not, the lifting operation shall be terminated.

(2) Other weather and environmental conditions. A qualified person shall determine if, in light of indications of dangerous weather conditions, or other impending or existing danger, it is safe to lift personnel. If not, the lifting operation shall be terminated.

j. Employees being hoisted shall remain in the continuous sight of, and in direct communication with, the crane operator or signal person. In situations where direct visual contact with the operator is not possible and the use of a signal person would create a greater hazard for that person, direct communication by radio shall be maintained at all times. The crane operator shall bring all operations to an immediate stop if radio communications are lost.

k. Taglines shall be used to help control the work platform unless the competent person determines that their use creates an unsafe condition.

l. The crane or derrick operator shall remain at the controls at all times with the crane engine running whenever the platform is occupied.

m. Hoisting personnel within 20 ft (6 m) of a power line that is up to 350 kV and hoisting personnel within 50 ft (15.2 m) of a power line that is over 350 kV is prohibited, except for Power Transmission and Distribution Work.

16.T.07 Operational Criteria

a. Hoisting of the personnel platform shall be in a slow, controlled, cautious manner with no sudden movements.

b. Load lines shall be capable of supporting, without failure, at least 7 times the maximum intended load, except where rotation resistant rope is

used the lines shall be capable of supporting, without failure, at least 10 times the maximum intended load. The required design factor is achieved by taking the current safety factor of 3.5 and applying the 50% de-rating of the crane capacity.

c. The crane shall be uniformly level within 1% of level grade and located on firm footing. Cranes equipped with outriggers shall have them all fully deployed to load chart criteria following manufacturer's specifications, as applicable, when hoisting personnel.

d. The total weight of the loaded personnel platform and related rigging shall not exceed 50% of the rated capacity for the radius and configuration of the crane or derrick.

e. Only cranes with power-operated up and down boom hoists and load lines shall be used to support work platforms. The use of machines having live booms is prohibited. Platforms shall be lowered under power and not by the brake.

f. Only cranes with an A2B device that prevents contact between the load block or overhaul ball and the boom tip, or a system that deactivates the hoisting action before damage occurs shall be used.

g. Cranes with variable angle booms shall be equipped with a boom angle indicator readily visible to the operator.

h. Cranes with telescoping booms shall be equipped with a device to indicate clearly to the operator, at all times, the boom's extended length, or an accurate determination of the load radius to be used during the lift shall be made prior to hoisting personnel.

i. The load line hoist drum shall have a system or device on the power train, other than the load hoist brake, that regulates the lowering rate of speed of the hoist mechanism (controlled lowering). Free fall is prohibited.

16.T.08 Trial Meeting, Lift and Inspection.

a. Prior to every trial lift, the crane or derrick operator, signal person, employees to be lifted, and the competent person shall attend a pre-lift

meeting to review the applicable parts of this manual, the AHA, and the details of this particular lift.

b. A trial lift with the unoccupied work platform loaded at least to the anticipated lift weight shall be made from the ground level, or any other location where employees will enter the platform, to each location at which the work platform is to be hoisted and positioned.

c. The trial lift shall be made immediately prior to placing personnel on the platform and shall be repeated prior to hoisting employees after the crane is moved and set up at new location or returned to a previously used location, and when the lift route is changed unless the competent person determines that the route change is not significant.

d. The operator shall determine that all systems, controls, and safety devices are activated and functioning properly; that no interferences exist; and that all configurations necessary to reach those work locations will allow the operator to remain under the 50% limit of the crane's rated capacity.

e. Materials and tools to be used during the actual lift may be loaded in the platform (evenly distributed and secured) for the trial lift.

f. After the trial lift and just prior to hoisting employees, the platform shall be hoisted a few inches and inspected to ensure that it is secure and properly balanced.

g. A visual inspection of the crane, derrick, rigging, work platform, and the crane or derrick support base shall be conducted by a competent person immediately after the trial lift to determine whether the testing has exposed any defect or produced any adverse effect upon any component or structure.

h. Any defects found during inspection which create a safety hazard shall be corrected before hoisting personnel.

i. If the load rope goes slack, the hoisting system shall be re-inspected to ensure that all ropes are properly seated on drums and sheaves.

16.T.09 Proof Testing

a. At each job site, prior to hoisting employees on the work platform, and after any report or modification, the platform and rigging shall be proof tested to 125% of the platform's rated capacity by holding it in a suspended position for 5 minutes with the proof test load evenly distributed on the platform (this may be done concurrently with the trial lift).

b. After proof testing, a competent person shall inspect the platform and rigging. Personnel hoisting shall not be conducted until the proof testing requirements are satisfied.

16.T.10 Personal Fall Protection.

a. For work over water, see section 21.N for fall protection and PFD requirements. Lifesaving equipment and safety skiffs meeting the requirements of this manual shall be available.

b. When NOT working over water, all employees occupying the work platform shall use a properly anchored personal fall protection (arrest or restraint) system. The system shall be attached to a structural member within the platform.

(1) The attachment points to which personal fall arrest or restraint systems are attached on the platform must meet the anchorage requirements in Section 21.

(2) Depending on the type of work to be done and the height of the work platform above a lower surface, all workers shall wear a full-body harness as part of a fall arrest or fall restraint system. The competent person for fall protection on-site will assess each situation and determine which system would best fit the current work requirement and be in accordance with the crane manufacturer's instructions and recommendations. Particular attention should be paid to anchor points and capacities.

(3) Workers working from the platform suspended from a crane are permitted to be tied off to the lower load block or overhaul ball. An AHA shall be developed to details on how work will be safely performed. AHA must be submitted to the GDA for acceptance.

(4) Anchoring to the load line. A personal fall arrest system is permitted to be anchored to the crane/derrick's hook (or other part of the load line) where the following requirements are met:

(a) A Qualified Person has determined that the set-up and rated capacity of the crane/derrick (including the hook, load line and rigging) meets or exceeds the requirements in Section 21.H. This information shall be placed in/attached to the AHA developed for the activity.

(b) The equipment operator shall be located in or adjacent to the crane cab, has been informed that the equipment is being used for this purpose, shall remain in contact (verbal, radio, hand signals) with the flagman for the operation and shall remain in direct control of any intended movement of the load line. If the operator is not in the cab, the controls shall be locked/tagged out so that no movement of the load line can occur without his knowledge.

(c) No load is suspended from the load line when the personal fall arrest system is anchored to the crane/derrick's hook (or other part of the load line).

16.T.11 Employees shall not be hoisted unless the following conditions are determined to exist:

a. The load test and proof test requirements are satisfied;

b. Hoist ropes are free of kinks;

c. Multiple part lines are not twisted around one another,

d. The primary attachment is centered over the platform, and

e. The hoisting system is inspected if the load rope is slack to ensure all ropes are properly seated on drums and in sheaves.

16.T.12 Traveling.

a. Hoisting of personnel while the crane is traveling is prohibited, except for:

(1) Portal, tower, and locomotive cranes; or

(2) Where it is demonstrated and documented that there is no less hazardous way to perform the work.

b. If the requirements above (16.T.12.a) are satisfied, the following safeguards shall be implemented while cranes travel with hoisted personnel:

(1) Crane travel shall be restricted to a fixed track or runway;

(2) Travel shall be limited to the load radius of the boom used during the lift;

(3) The boom must be parallel to the direction of travel;

(4) A completed trial run shall be performed to test the route of travel before employees are allowed to occupy the platform (this trial run may be performed when the trial lift required by this manual is performed.

16.U BASE-MOUNTED DRUM HOISTS USED TO HOIST PERSONNEL, GUIDED AND NON-GUIDED WORKER'S HOISTS [WHETHER POWERED BY INTERNAL COMBUSTION ENGINE, ELECTRIC MOTOR OR OTHER PRIME MOVER (AIR TUGGERS)]

16.U.01 The use of this equipment to hoist personnel requires the development of a written Standard Operating Procedure (SOP). All personnel involved with the use of this equipment shall assist in the development of this SOP. The SOP shall be maintained for a period of no more than12 months, at which time it shall be reviewed and changed as necessary.

16.U.02 This equipment shall meet the applicable requirements for design, construction, installation, testing, inspection, maintenance and operations as required by the manufacturer, to include an 8:1 safety factor for the hoist rope. ***See ANSI A10.22.***

16.U.03 For operations within the scope of the ANSI A10.22 standard, a base mounted drum hoist (rope-guided) or non-rope guided hoists shall be used when hoisting personnel. The hoist shall be used in accordance with the manufacturer's recommendations for these applications.

16.U.04 The hoist machine shall meet all criteria set forth in Paragraph 4 of the ANSI A10.22.

16.U.05 The operator of the hoist shall be qualified and instructed in the proper operation of the hoisting system, in accordance with manufacturer's recommendations.

16.U.06 The operator shall meet the physical qualifications as detailed in 16.B.06.

16.U.07 The hoist may be used to hoist materials or personnel, but not both simultaneously.

16.U.08 Voice communications shall be maintained between the hoist operator and each landing.

16.U.09 A minimum of two guide ropes (for rope-guided hoists) shall be used when transporting personnel in the cage. Splicing of the hoisting and guide ropes shall not be spliced except for the formation of end terminations.

16.U.10 A sign stating capacity in number of persons and rated loading in pounds shall be posted on the cage.

16.U.11 Inspection and Testing.

a. Visual checks shall be conducted daily prior to use (during use).

b. Inspections (no drop test) shall be conducted weekly when hoist is in continuous operation and before reuse following periods of idleness in excess of one week.

c. Documentation at each job location shall be maintained and kept on file for at least 2 years.

16.U.12 Non-Guided Worker's Hoists/Air tugger hoists. This equipment may be substituted for a base mounted drum hoist and in addition to the requirements above, must meet the following:

a. Hoist shall be secured in position to prevent moving, shifting or dislodgement;

b. Hoist machine may be operated at cable speeds not to exceed 110 ft/min when transporting personnel on a non-guided worker's hoist;

c. An independent lifeline and a full body harness shall be provided and used by any person being transported by a non-guided hoist ;

d. Rope grabs (fall prevention devices) for connecting a safety harness to the lifeline shall be of a type that can be attached to or detached from the independent lifeline. They shall be compatible with the lifeline size and type of material being used. Attachment to the lifeline shall be maintained at a point above waist height of the person. Other devices that provide equivalent safety may be used;

e. Minimum wire rope diameter shall be 5/16 inch (7.9mm);

f. Non-guided hoist line shall be weighted as necessary to prevent line run of the hoisting rope.

16.V POWERED INDUSTRIAL TRUCKS (PIT'S) /TELEHANDLERS

This equipment shall not be used to hoist personnel unless allowed by the manufacturer with an approved hoisting attachment.

16.V.01. This equipment may only be used to transport or hoist loads if allowed by the equipment manufacturer. If these procedures are unavailable, you are prohibited from performing this function.

16.V.02. Operations involving the use of PIT's and rigging to transport or hoist loads require different operator skills and considerations than the standard PIT operations performed with this equipment. When PIT's are to be used to transport or hoist loads utilizing hooks, eyes, slings, chains, or other rigging the following requirements shall apply:

(a) Proper operating procedures in accordance with the equipment manufacturer's operating manual ;

(b) Written proof of qualifications of equipment operators, riggers, and others involved in the transporting and hoisting operations;

(c) Proper use and on site availability of manufacturer's load rating capacities or charts as related to approved attachments;

(d) Proper use of rigging, including positive latching devices to secure the load and rigging;

(e) Inspection of rigging;

(f) Use of tag lines to control the load;

(g) Adequate communications, and

(h) An AHA specific to the transporting or hoisting operation must be developed and provided to GDA.